INFORMATION AND REPORTS

WORKING MEETING ON SUNFLOWER GENETICS AND WILD SPECIES

(Sindos, Greece, 22—25 July 1986)

1. **The purpose** of the meeting was to review the results obtained in the last two years and to discuss the future development of the joint research activities, as well as to facilitate the exchange of experience and knowledge in the field of the following two subnetworks :

— Sunflower applied genetics ;

— Collection, evaluation and conservation of wild species and their use in sunflower breeding programmes.

2. **Organization and participation.** The working meeting was organized by the Co-ordination Centre of the F.A.O. Research Network on Sunflower — the Research Institute for Cereals and Industrial Crops of Fundulea, Romania, and the Cotton and Industrial Plants Research Institute of Sindos-Thessaloniki, Greece, with the remarkable assistance of its director, dr. Sotirios Sotiriadis and his co-workers who provided an excellent organization of the whole workshop.

In organizing this meeting, the Co-ordination Centre of Fundulea observed the recommendations of the ESCORENA Board to encourage the organization of working meetings instead of review and co-ordination visits of the Liaison Officers or other research workers, in order to employ more efficiently the alloted funds and enhance the scientific research co-operation.

The working meeting was attended by 14 participants from 8 countries : Czechoslovakia (A. Kovačik), France (H. Serieys et G. Piquemal), F. R. Germany (W. Friedt), Greece (S. Sotiriadis, G. Kontas, Helen Setatou, Urania Kechagia), Italy (G. P. Vannozzi, P. Megale, M. Baldini, Paola Belloni, E. Salera), Romania (A. V. Vrânceanu, F. M. Stoenescu), Spain (J. Fernandez-Martinez), and Yugoslavia (D. Skorić), and by 12 observers from France (2) and Greece (10).

The travel expenses for 6 delegates were supported by the F.A.O. Regional Office for Europe.

3. **The programme of work** combined a comprehensive review and discussion of the past and future activities of the subnetworks with visit of sunflower nurseries and commercial fields. The participants had the possibility in this way to debate not only the theoretical aspects of the joint investigations but also the methodology and experimental techniques. Six scientific papers based on topics related to the respective subnetworks were presented and discussed.

The working meeting was chaired by dr. A. V. Vrânceanu, co-ordinator of the F.A.O. Research Network on Sunflower, assisted by dr. F. M. Stoenescu and dr. S. Sotiriadis. Mrs. Z. Bagtzoglou, Director of the Centre for Agricultural Research of Northern Greece, greeted the participants, appreciating the efforts that F.A.O., together with the Cotton and Industrial Plants Research Institute of Sindos had made in organizing the meeting, which will contribute to the development of sunflower research and cropping in Greece.

4. **In the first day,** Prof. dr. A. Kováčik, the Liaison officer of the **subnetwork on applied genetics**, with the Liaison centre at the Research Institute for Crop Production in Prague-Ruzyné, presented a detailed progress report on the main achievements and considerations concerning the further development of the joint studies.

Co-operation in this field has been progressively developed by seven countries with a tradition in sunflower genetic research.

So far, a range of experimental hybrids has been produced by diallel crosses and evaluated in different environments in respect of the genetic control of the main quantitative traits involved in sunflower yielding capacity. Valuable information concerning head position and stem bending under head, head size and shape, fertility of the central zone of the head, seed size and shape, was obtained. The evaluation was based on the analysis of variance with Tukey and Hyman methods of determination of the least significant differences among means of entries and simple correlation and regression analysis of phenotypic values of individual traits.

A large number of genotypes, especially cultivars experimented in the international trials,

were evaluated in different environmental conditions for pollen self-fertility, and correlations between this trait and the other main plant and seed traits were established. An important genetic study also has been carried out on combining ability of sunflower inbred lines. Preliminary results were presented and discussed.

With regard to the traits determined by major genes, the actual knowledge on heritability of branching in sunflower has been enriched. For example, certain single headed female inbreds should not be used in crosses to obtain branched restorer males because of a partial epistasis of **b** gene in F_1.

5. **In the second day,** Prof .dr. Dragan Skorić, the Liaison officer of the **subnetwork on the collection, evaluation and conservation of wild species and their use in sunflower breeding programmes,** with the Liaison centre at the Institute for Field and Vegetable Crops of Novi Sad, presented a comprehensive review of the joint activity in the last two, three years, followed by discussions and proposals for its future improvement.

The co-operative research in the frame of this subnetwork has also rendered encouraging results. The Liaison centre, assisted by the U.S.D.A. researchers, succeeded in collecting and studying more than 600 new accessions of wild *Helianthus* species. This germplasm has completed and renewed the already existing three large collections (in Novi Sad, Montpellier and Fundulea), from which seed samples have been distributed to all interested participants of the subnetwork.

Most entries have been already screened for resistance to disease and pest attack, and for tolerance to the environmental stress in six countries. The degree of their crossability to cultivated sunflower and their self-fertility have been evaluated. A large number of interspecific crosses was performed in order to transfer the positive characters of wild species into the cultivated genotypes, as well as to identify new sources of cytoplasmic male sterility and the corresponding restorer genes.

The joint research works on new sources of cytoplasmic male sterility resulted in the identification of certain promising new genetically different types coming from interspecific crosses of wild species to cultivated sunflower.

6. **In the third day, six scientific papers** based on subjects adopted by the two subnetworks were presented and discussed. Three of them focussed on the joint investigations regarding the search for new cytoplasmic male sterility sources in order to diversify the genetic background of sunflower hybrids and avoid their genetic vulnerability. Valuable contributions in this respect have been brought by dr. H. Serieys (Montpellier) and dr. F. M. Stoenescu (Fundulea). One paper was concerned with an interesting model of genetic evaluation of the complex traits (Prof. dr. A. Kováčik) and the other two with studies of different traits of the interspecific hybrids (G. P. Vannozzi and P. Megale).

7. **Discussions and decisions.** The group of participants expressed numerous opinions and suggestions concerning the improvement of the activity in the frame of the two subnetworks, which were taken into consideration in the organization of the **working groups** corresponding better to the actual and future trends of the scientific investigations in these fields.

The participants considered unanimously that the two subnetworks should continue to work independently, with the same Liaison centres, taking into account the promising results already obtained and the general interest for developing these joint research programmes.

It was agreed that the subnetwork on applied genetics reorganize its research programme into two working groups as follows :

a) Genetic study of sunflower agronomic traits. Group leader : Prof. dr. A. Kováčik (Ruzyně-Prague). The main research subject will aim at elucidating the heredity of those quantitative and qualitative traits which contribute to sunflower yield formation. Biometric methods will be applied for genetic evaluation of these traits.

b) Genetic study of physiological and biochemical characters. Group leader : dr. J. Fernandez-Martinez (Córdoba). Subjects :

— Genetic study of self-fertility in sunflower. Subject leader : INIA Department of Oil Crops, Córdoba, Spain.

— Genetic study of disease resistance in sunflower. Subject leader : Institute of Field and Vegetable Crops, Novi Sad, Yugoslavia.

— Genetic study of physiological characters. Subject leader : Institute of Agronomy, Pisa, Italy.

— Genetic study of oil and protein content and quality. Subject leader : Institute of Wheat and Sunflower, General Toshevo, Bulgaria.

The subnetwork on the collection, evaluation and conservation of wild species and their use in sunflower breeding programmes examined the parallelism existing between its activity and certain objectives of the European Group for Sunflower Genetic Resources constituted by the International Board for Plant Genetic Resources in 1984. The participants agreed to continue to co-operate only in the field of evaluation and use of wild species in breeding programmes. Therefore, the denomination of this subnetwork has been reformulated as "Genetic evaluation of *Helianthus* wild species and their use in breeding programmes". The Liaison centre of this subnetwork remains at the Institute for Field and Vegetable Crops of Novi Sad, Yugoslavia, with Prof. dr. Dragan Skorić as Liaison officer. The following three working groups have been established :

The participants in the Working Meeting of Sindos–Greece

a) Determination of morpho-physiological and biochemical characteristics and taxonomical aspects of wild *Helianthus* species. Group leader : Prof .dr. D. Skorić, Novi Sad. Subjects :

— Cytogenetic study of wild species and interspecific hybrids. Subject leader : Research Institute for Cereals and Industrial Crops, Fundulea, Romania.

— Study of germinability of wild species and interspecific hybrids. Subject leader : Institute of General Agronomy and Plant Cultivation, Pisa, Italy.

— Evaluation of wild *Helianthus* species for disease resistance. Subject leader : Institute for Field and Vegetable Crops, Novi Sad.

— Evaluation of wild *Helianthus* species for drought and salt tolerance. Subject leader : INIA Department of Oil Crops, Córdoba, Spain.

— Use of wild *Helianthus* species in breeding for oil and protein content and quality. Subject leader : Institute of General Agronomy and Plant Cultivation, Pisa, Italy.

b) Identification, study and use of **cms** and **Rf** sources in sunflower breeding. Group leader : dr. H. Serieys, Station d'Amélioration des Plantes INRA, Montpellier, France.

c) Use of biotechnology in interspecific hybridization. Group leader : Prof. dr. W. Friedt, University of Giessen, F. R. Germany.

8. **Technical visits.** On 24 July 1986, the participants visited the sunflower breeding nursery of the Experimental Farm of the Sindos Institute, including the F.A.O. sunflower trials. Various aspects of domestic research on this crop, as well as of the co-operative experimentations were analysed and discussed.

On 25 July 1986, the fourth day of the Sindos working meeting, an interesting study trip was organized in the Thessaloniki Valley and Kassandra peninsula. Several sunflower fields were examined an the potential of this crop in the respective zone was evaluated.

Dr. **F. M. Stoenescu**