

**Report of a
Working Group
on Sunflower**
(Second Meeting)

**Held in
Szeged, Hungary
15-17 April 1986**

**UNDP/IBPGR EUROPEAN
COOPERATIVE PROGRAMME
FOR CONSERVATION AND
EXCHANGE OF CROP
GENETIC RESOURCES**



International Board for Plant Genetic Resources



United Nations Development Programme

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EUROPEAN COOPERATIVE PROGRAMME FOR THE
CONSERVATION AND EXCHANGE OF CROP GENETIC RESOURCES

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Sunflower
(Second meeting)

held at the
Cereal Research Institute
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UNDP-IBPGR
May 1986

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INTRODUCTION

The second meeting of a Sunflower Working Group was held at the Cereal Research Institute (CRI), Szeged, Hungary, 15-17 April 1986, by kind invitation of the Institute's Director. The meeting was organized by the European Cooperative Programme for the Conservation and Exchange of Crop Genetic Resources (ECP/GR). A list of participants is provided in Appendix I.

The participants were welcomed by Dr. I. Szánuel, General Director of the CRI, who outlined the importance of a coordinated programme for genetic resources and described the activities of its Institute. Dr. J. Frank, Head of the Oil Crop Department of the CRI, provided details of his breeding programme for sunflower outlining the extent of genetic variability available in his collection for a set of selected characters. The participants had an opportunity to visit the Kalmar Laboratory of Cybernetics, University of Szeged.

Mr. P.M. Perret briefly reported on the progress of the ECP/GR.

Dr. F. Vear was unanimously elected as Chairman of the Working Group. The Agenda, as modified and approved, is shown in Appendix II.

REPORT

REVIEW OF CURRENT ACTIVITIES

European data base for cultivated sunflower

1. Mr. Gy. Gal, documentation officer of the European data base for cultivated sunflower at CRI provided details of the European list of accessions, held in genebanks, which had been distributed by November 1985 to all originators of the data. A new print-out, with a revised format, was presented at the meeting. This list includes 1338 accessions from 9 countries.

2. It was noted that the number of passport data provided per accession varied from 5 to 16; on average data on no more than half of the 20 passport descriptors agreed at the first meeting of the Working Group were available.

With the exception of the Aegean Regional Agricultural Institute, Izmir, Turkey, no institutes had returned comments and amended data after they had received the print-out in November. In addition, the need for more standardization of the data was recognized. The meeting agreed on measures to remedy these deficiencies (see para. 14).

3. It was remarked that in some cases inbred and breeders lines were also included in the lists and there was a general consensus that only open pollinated varieties, landraces and gene pools (populations) should be included in the European list. Nevertheless, it was agreed that inbred or breeders lines which had an historical value or contained specific characteristics of great use for breeders should also be included because they have a special justification.
4. The members agreed that a first identification of duplicates should be made through names and numbers of accessions. It was stressed that such an identification of duplicates could only be confirmed by checking with evaluation data (see para. 24).
5. It was noted that data from Federal Republic of Germany, Poland, Portugal and Romania have not been provided and it was agreed that these countries must be urged to send their data as soon as possible.

European data base for wild sunflower

6. Mr. M. Minaljcevic, documentation officer of the European data base for wild sunflower, Institute for Field and Vegetable Crop (IFVC), Novi Sad, Yugoslavia, presented the list of accessions held in European collections. Since the curators of collections had supplied mostly accession data, and not collection data, the IFVC had selected 8 accession descriptors for insertion into the catalogue, which includes 1384 accessions from 8 countries including, from the USA, Conservation and Production Research Laboratory, Bushland, Texas, of Agricultural

Research Service United States Department of Agriculture, and North Dakota State University (NDSU). All other information received has been filed into the computer.

All European collections holding wild species had provided data.

7. The accessions have been classified following the taxonomic system in The North American Sunflower by Heiser et al., 1969; Memoirs of the Torrey Bot. Club; 22(3). There was a general agreement on this choice and it was strongly recommended that all curators adopt this taxonomic system.
8. The largest number of accessions held in European collections comes from ARS, Bushland, Texas and the number of duplicates is obviously very high. After a careful scrutiny of the available collecting data, the IFVC discovered certain ambiguities in the identification of duplicates due to the problem of multiple donations together with absence or inaccurate use of donor names and other numbers or due to absence of information on multiplications, regenerations which have been carried out in the institutes holding the material. The meeting recommended that IFVC request ARS, for full collection data on those accessions held in Europe and which have been assigned a USDA Plant Inventory number. Searches in this field will lead to a final list of unequivocal duplicates.
9. The meeting expressed its gratitude for the work achieved so far by the two European data bases.

Collecting

10. Dr. Skoric participated with IBPGR support, on a collecting mission in 1985 in Northeastern USA organized by the ARS-USDA and reported on the results of this trip. Ninety accessions were collected; all of them, except one, are perennials. Since perennial species of sunflower evolved in Northeastern, USA. in environments unsuitable for the plant (high rainfall, cold winters, altitudes often superior to 1500 m), the collected populations are particularly important as potential sources of disease resistance. The need to continue further collecting in this area using boats for riverside habitats (especially the Hudson River in New York state) was stressed, as more annual species, which are under strong genetic erosion, can be collected.

The seed material is under multiplication in the IFVC and will be available for distribution in 1987, whereas vegetative material collected as rhizomes is being grown by ARS, at Bushland and seeds will be sent in 1987 to Novi Sad for multiplication.

Training

11. A Greek scientist had taken the opportunity for training offered by the ECP/GR through a 2-week study tour to the IFVC, Yugoslavia. The documentation officer from the European data base for cultivated sunflower had visited Poland and UK also for a 2-week period. The latter specialist reported enthusiastically on "experience" gained for his data base after discussions with colleagues.

The meeting recommended that the documentation officer from the European data base for wild sunflower should also undertake a similar study tour with support of the ECP/GR.

Other recommendations issued at the first meeting

12. Concerning the recommendation of the first meeting that IFVC act as a repository for relevant literature or information on maintenance of wild species, it was noted that no publications had been received. The IFVC agreed to circulate by the end of 1986 a list of all their publications; it is hoped that, subsequently, other institutes will collaborate by sending photocopies of their publications.
13. The draft descriptor list prepared during the first meeting had been circulated worldwide by the ECP/GR Secretariat and useful comments were received. Subsequently, Dr. Skoric finalized this version and the IBPGR Descriptors for Sunflower were published by IBPGR in June 1985. The meeting noted with satisfaction that the Genebank Committee of the COMECON countries had adopted this list as a reference.

WORKPLAN 1986-1989

Completion of passport data and standardization of accession list

14. It was agreed that all originators of data should send to the two data bases a corrected list of their accessions at the latest by the end of June 1986. They will, additionally, attempt in the same time to complete as far as possible the passport data which are lacking and strictly follow the definitions provided in the IBPGR Descriptors for Sunflower.
15. Members agreed that the descriptor STATUS OF SAMPLE (number 2.11 of Descriptor for Sunflower) should be modified in order to give more precise information on the evolutionary origin of an accession ^{1/}. Equally it was agreed that ACCESSION SIZE (number 1.9) was of the utmost importance for genebank management, but the precise number has no real significance at the international level and should be substituted by availability of seeds. An accession is available when for wild species more than 100 seeds and for cultivated sunflower more than 1000 seeds are conserved.

Distribution and updating of European lists

16. The meeting agreed that the most economic way to distribute catalogues would be as magnetic tapes or floppy discs. This will allow the users to question the data bank directly. It was recognized that as long as the data bases will follow the recommendations issued at the ECP/GR Workshop on Exchange of Information, Radzikow, Poland, 23-25 October 1984, documentation officers should not encounter problems in integrating the data of the European data bases into their systems. The transfer of data on floppy discs would require only the additional of technical information from the documentation officer of the two European data bases.

"

^{1/} The descriptor's states of descriptor 2.11 STATUS OF SAMPLE will now be as follows:

- | | | |
|-------------------|--------------------------------|--------------------|
| 1. Wild | 4. Primitive cultivar/landrace | 7. Synthetic |
| 2. Weedy | 5. Inbred line | 8. Ornamental |
| 3. Breeder's line | 6. Hybrid | 9. Other (Specify) |

In the case of hardware incompatibility between the sender and the receiver, a file transfer centre will be used (e.g. Plant Breeding and Acclimatization Institute, Radzikow, Poland, for Apple II).

17. The Working Group recommended that curators of collections send each year, between 1 January and 1 April, to the respective data bases the 20 passport descriptors for the accessions they have collected during the year or for accessions donated to them and not yet included in the European list. Curators will provide, at the same time, any necessary amendments on their data, such as availability of seeds, number of regenerations, etc.

Further registration of characterization and evaluation data

18. The Working Group recommended that curators of collections provide both data bases with all available characterization and evaluation data at the latest by 15 November 1986. Curators should attempt to convert as far as possible their data into the format of the IBPGR descriptors but it was agreed that data sent in another format would be accepted, as long as definitions of the descriptors and all explanations on descriptor states are provided.
19. The meeting considered at length which characters would be most useful for breeders and also which ones could be recorded by curators without imposing too great a workload and additional costs. Consequently, it selected a list of 8 descriptors for cultivated sunflower and of 13 descriptors for wild sunflower (Appendix III).
20. The need for a reference for the descriptors Plant height and Days to flowering was recognized and the members agreed that the inbred line HA89 would be suitable. Furthermore, the Chairman of the Working Group accepted responsibility for distribution by end of 1986 of approximately 50 g of HA89 to each European curator in order that exactly the same genotype be used by all curators. Thereafter, the curators will multiply their reference (inbred line) for further use in 1988 and 1989.
21. It was agreed that the 8 characters selected for cultivated sunflower should be observed on all material, because very few real duplicates at the genotypic level may exist due to the numerous regenerations

previously carried out. Furthermore, in some cases, named duplicates are quite different, because they have, in the past, undergone deliberate selection by different countries.

22. The 13 characters chosen for wild sunflower material should also be observed on all the material including potential duplicates due to the very limited number of plants in each accession and possible genetic drift. Additionally, it was pointed out that in most cases, sample sizes were so small that in fact a different part of the genetic variation of the population has been distributed to each institute. This is easily demonstrated by a coefficient of variation for certain characters inside an accession which exceed 100%.
23. In regard to (i) the limited number of accessions of wild species, (ii) the availability of data for most of the required descriptors and (iii) the need for frequent regeneration of this material, it was agreed that curators should provide to the data base for wild sunflower data on the 13 characters mentioned above for all their accessions at the latest by the end of 1988.

Considering that (i) the documentation of the 8 characters for cultivated material could not be rated as an urgent priority for curators of collections (which most of the time are also breeders) and (ii) that on an average an accession is actually regenerated every 5 years, it was agreed that every year curators of collections should provide data to the data base on a minimum number of accessions which should equal 20% of the total number of their accessions (without taking into consideration the number of accessions for which data are already available).

Rationalization of collections

24. It was agreed that no attempt to rationalize collections should be made before data on the selected characters for wild species and cultivated sunflower have been registered into the data bases. Only at this stage, can decision be taken about final duplicates through analyses of the characterization and evaluation data.
25. Nevertheless, there was a strong consensus that around the world approximately 100 open pollinated varieties could be identified that

indeed represent the variability and are progenitors of nearly all the existing material. These can constitute a reference collection which should be conserved as a priority for future generations of mankind. A preliminary draft of this list is provided in Appendix IV.

It was agreed that the CRI finalize, with the active support of the ECP/GR Secretariat, this list as soon as possible. The Working Group strongly recommended that the designated holders of these open pollinated varieties apply very high standards of regeneration involving at least 500 plants and very strict isolation or sibbing.

Base collection ^{1/}

26. The Working Group accepted with satisfaction the offer of the Research Institute of Plant Production, Praha-Ruzyne, Czechoslovakia, to act as a European sunflower base collection. It was agreed that the first priority for this base collection was to implement the safe duplication of open pollinated varieties mentioned in para. 25 and it was subsequently recommended that designated holders of the reference varieties send about 1 kg of seeds of each variety to the base collection by autumn 1987.
27. It was noted that in the case of perennial species, only a very limited number of seeds could be sent to the base collection due to the low seed set. It was agreed that 100 seeds would be an absolute minimum. The number will vary according to the species; furthermore, the researcher from IFVC working on germination and dormancy of wild seeds will give all the necessary advice to the base collection.
28. It was also stressed that some wild species could be conserved as rhizomes in cold conditions or eventually in tissue culture and the Working Group draws the attention of IBPGR to the need for more studies in this area.

^{1/} Base collections are intended for long-term seed storage at low temperatures (sub-zero) and not for exchange of material unless such material is not available in active collections.

Further collecting

29. The meeting was informed that the ARS-USDA was planning a collecting trip in 1987 in the Northwestern USA (Montana, Washington, Oregon, Idaho, Northern California, northern Nevada and northern Utah) and would welcome again the participation of European scientists. It was recommended that a researcher from the IFVC, which has the responsibility for the maintenance and distribution of wild sunflower species in the FAO sunflower sub-network, be supported by IBPGR for the cost of his participation. This fruitful European-USA collaboration should be continued in the future under plans formulated by USDA in 1988 in the Midwestern USA (Wisconsin, Michigan, Illinois, Indiana and Ohio); in 1989 in the Great Plains area (Nebraska, Kansas, parts of Oklahoma, Colorado and Wyoming). Other curators expressed their interest in participating in these missions, but it was admitted that the number of participants could not exceed four specialists for obvious cost-effective reasons.
30. Members were informed that CRI, Hungary, is interested in organizing a collecting trip for wild sunflower in the USA in 1987, if agreement can be reached. In view of the past collecting missions and the planning of the USDA (see paragraph above), it was recommended that efforts be concentrated in the region of the Great Lakes for a period of two months (mid-August to mid-October) in order that both annual and perennial species could be collected. It was agreed all necessary information on sites and species previously collected should be collated beforehand.

Development of active collaboration with other regions

31. In order to implement de facto a world data base for sunflower, it was agreed that European data bases send all their data in computerized form to curators of important world collections, e.g. USA, Canada, Australia, USSR; it is expected that these curators will then reciprocate.
32. The historical importance and leading position of sunflower genetic resources collections in the USSR was stressed and it was agreed that curators of these collections should be asked to comment on characterization and evaluation data of old varieties originated in the

USSR. It was also pointed out that Soviet authorities should be requested to send to the base collection their most important open pollinated varieties for the benefit of others.

33. The Instituto Nacional de Tecnología Agropecuaria (INTA), Argentina, has a very active sunflower programme for breeding and conservation of genetic resources and it was agreed that the ECP/GR Secretariat will ask them to join the activities of the ECP/GR Sunflower Working Group. Other Institutes particularly in developing countries, which would also like to participate will be cordially welcomed. It recognized that links with China on a bilateral basis were developing, but it was hoped that collaboration will also develop at the level of the Working Group.

Other matters

34. It was noted that many universities and research stations were becoming interested in sunflower genetic resources and it was recommended that every effort be made to include them in the European network by seeking their assistance to characterize and evaluate accessions.
35. It was also pointed out that many private firms have benefitted from the efforts of national programmes. It was agreed that they should be requested to also involve themselves in the workload of the programme by evaluating and regenerating accessions.
36. The Working Group should take the opportunity at other meetings on sunflower (e.g. FAO sunflower meeting in Szeged, in August 1987) to meet informally, review progress of the programme and take measures to resolve any pending problems. It was agreed that the next formal meeting of the Working Group should be convened on the beginning of 1989 and it was suggested that the Department of Oil Crops, Instituto Nacional de Investigaciones Agrarias, (INIA), Córdoba, Spain be asked to host this meeting.

The Working Group expressed its appreciation to the Director and staff of the Cereal Research Institute for the excellent organization of the meeting as well as the kind hospitality.

APPENDIX I

LIST OF PARTICIPANTS

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APPENDIX II

AGENDA

1. Opening Addresses
2. Elections of Chairman
3. Adoption of Agenda
4. Review of activities since first meeting
 - 4.1 European Sunflower data bases
 - 4.1.1. Discussion on preliminary sunflower lists
 - 4.1.2. Identification of those collections not yet included in the data base
 - 4.1.3. Identification of duplicates
 - 4.2 Review of progress on other recommendations of the first meeting
5. Formulation of a workplan for 1986-1989
 - 5.1 Further registration in sunflower data bases
 - 5.1.1. Registration of data from those collections not yet included in the data bases
 - 5.1.2. Completion of passport data
 - 5.1.3. Distribution of preliminary European list
 - 5.1.4. Registration of characterization and evaluation data
 - 5.2 Recommendations for further collecting
 - 5.3 Designation of base collection(s)
 - 5.4 Network of active collections for evaluation, maintenance and distribution of genetic resources material.
6. Other matters
7. Writing of report
8. Consideration of report and approval by Working Groups



LIST OF CHARACTERIZATION AND EVALUATION DATA
FOR FURTHER REGISTRATION IN EUROPEAN DATA BASES

a) Cultivated sunflower

- 5.2 1/ SITE (RESEARCH INSTITUTE)
- 5.4 SOWING DATE
- / Month/Year
- 4.1.3 Plant height (at full flowering)
- 4.2.1 Days to flowering
- 4.2.2 Head shape (grain side)
- 4.3.4 Weight of 1000 seeds
- 4.3.8 Oil percentage
- 6.3.7 Seed yield
- 8.1.1 2/ Homeosema nubullela
- 8.2.1 2/ Plasmopara helianthi

1/ The numbering follows the IBPGR descriptor list, which provides detailed information for recording of the data

2/ Use 0 for absence of attack
 1 for susceptible
 2 for segregation of the character into the population

b) Wild species

- 5.2 1/ SITE (RESEARCH INSTITUTE)
- 5.4 SOWING DATE
/Month/Year
- 4.1.3 Plant height (at full flowering)
Average from 10 main heads
- 4.2.1 Days to flowering
- 4.2.10 Type of branching
- 4.3.8 Oil percentage
- 6.1.1 Root type
- 6.2.4 Bract shape
- 6.2.7 Number of ray flowers
- 6.2.8 Shape of ray flowers
- 6.2.9 Colour of ray flowers
- 8.2.1 2/ Plasmopara helianthi
- 8.2.13 Erysiphe cichoracearum
- 10.3 CHROMOSOME NUMBER
- 10.4 RESTORER FERTILITY GENES

1/ The numbering follows the IBPGR descriptor list, which provides detailed information for recording of the data

2/ Use 0 for absence of attack
1 for susceptible
2 for segregation of the character into the population

APPENDIX IV

PRELIMINARY LIST OF REFERENCE OPEN POLLINATED VARIETIES

Argentina

15 old varieties to be identified

Canada

5 to be identified (e.g. Advance, Advent...)

China

To be identified

Czechoslovakia

Slovenska Siva
Bucaniska Oleijna
Vniimk 6540

Egypt

Giza

France

Nain Noir
Gris Strie
Yssenka
Peredovik

Hungary

Mezőhegyesi cirmos
Lovaszpatonai
Iregi, szador, ollenallo
Iregi csikos
Kisvardai
Szabolcsi

Iran

10 to be identified

Italy

Ala
Argentario
Amiata
Abbinia
Gianni
Tuscania
Maremma

Morocco

To be identified

APPENDIX IV (Continued)

Poland

To be identified

Romania

To be identified

Spain

USA

The Hopi types

USSR

About 50 to be identified (e.g. Pioner Sibiri, Stepniak, Vniimk 4966, Peredovik (possibly more than one), Smena, Armavirski, Zelianka, Voshod, Sputnik, etc.)

Yugoslavia

Peredovik
Vniimk 8931
Novi Sad 4
Novi Sad 20
Novi Sad 61
Novi Sad 317

