

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

IBPGR



REPORT OF A WORKING GROUP ON SUNFLOWER

(third meeting) held at the
Institute of Field and Vegetable Crops
Novi Sad, Yugoslavia
30 July 1988



December 1988

EUROPEAN COOPERATIVE PROGRAMME
FOR THE CONSERVATION AND EXCHANGE OF CROP GENETIC RESOURCES
(ECP/GR)

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ECP/GR/IBPGR
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The International Board for Plant Genetic Resources (IBPGR) is an autonomous international scientific organization under the aegis of the Consultative Group on International Agricultural Research (CGIAR). IBPGR was established by CGIAR in 1974. The basic function of IBPGR is to promote and coordinate an international network of genetic resources centres to further the collecting, conservation, documentation, evaluation and use of plant germplasm and thereby contribute to raising the standard of living and welfare of people throughout the world. Financial support for the core programme is provided by the Governments of Australia, Austria, Belgium, Canada, China, Denmark, France, Federal Republic of Germany, India, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom, and the USA as well as the World Bank

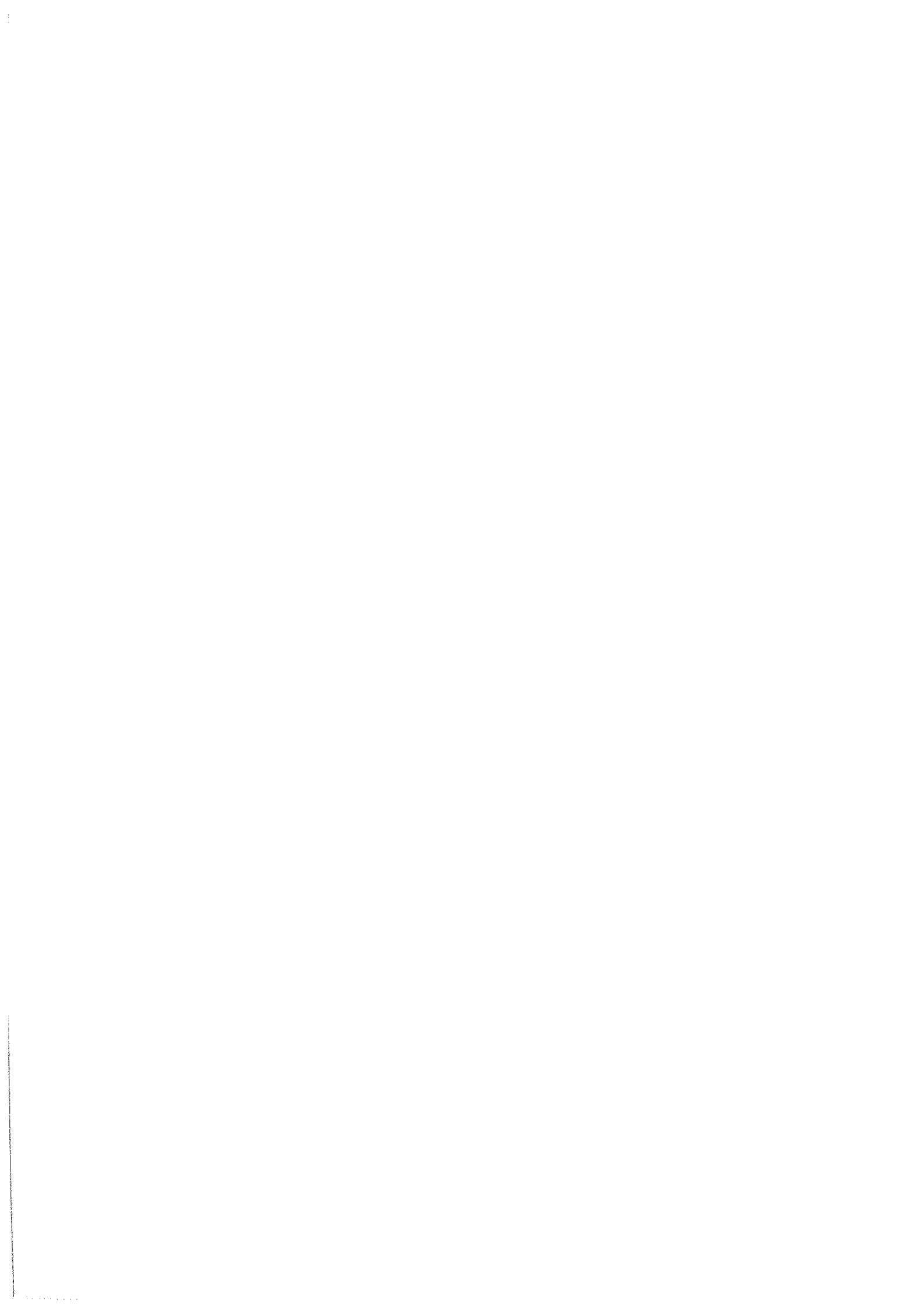
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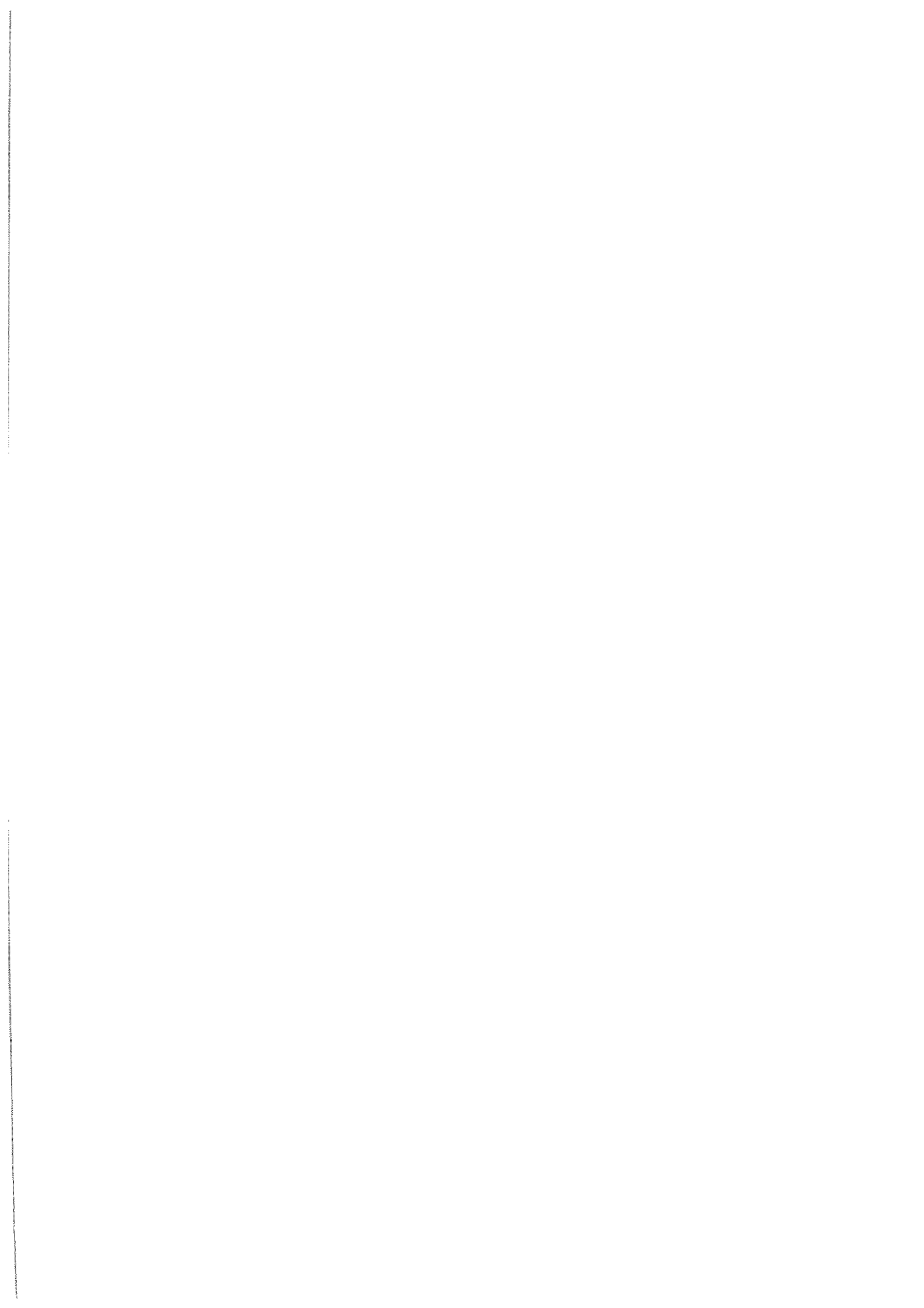


INTRODUCTION

The Working Session of the ECP/GR Sunflower Working Group held in the Cereal Research Institute (CRI), Szeged, Hungary, 29 July 1987, had recommended that the third meeting of the Group be convened in INIA, Córdoba, Spain, November 1988. It was thought that at this time, the two European sunflower data bases (Institute for Field and Vegetable Crops (IFVC), Novi Sad, Yugoslavia for wild species, and CRI for cultivated sunflower) would be in a position to distribute comprehensive European catalogues including passport data as well as the descriptive data recommended at the second meeting held at CRI, 20-23 May 1986. It appeared in Spring 1988 that the receipt of data by the two data bases was far below expectations and recommendations of the working session. It was therefore necessary to convene the third meeting of the Sunflower Working Group as early as possible to identify any constraints in the sending of data and to redefine a working plan.

As the XII International Sunflower Conference was to be held in Novi Sad, Yugoslavia, 25-29 July 1988 and all members of the Working Group were attending this important event, the third meeting of the ECP/GR Working Group was convened in the IFVC, at the kind invitation of Prof. Skoric, on Saturday 30 July 1988.

A list of participants is provided in Appendix I. The meeting noted the regrets of Prof. Kovacik who was unable to attend but took opportunity of his participation in the XII International Sunflower Conference to transmit his views and recommendations to the Group through a discussion with the ECP/GR Officer, Mr. P.M. Perret. Dr. Vannozzi was represented by two of his assistants, Drs. Megale and Palla. Dr. J. Fernández Martínez was unanimously elected as Chairman. The Agenda, as approved, is shown in Appendix II.



REPORT

REVIEW OF ACTIVITIES

European Sunflower data bases

1. Dr. Minaljcevic, the documentation officer of the data base for wild species, informed the members that since the last meeting, he had only received characterization and evaluation data from Fundulea, Romania. In addition the registered passport data still need to be checked and amended by most of the contributors. It was noted that the Institute of Genetics, Sofia, Bulgaria, was the only holder of a significant collection of wild species within Europe which had not yet provided any data. Italy had sent characterization and evaluation data on 30 hybrids (wild species X cultivated sunflower) (see para 14).
2. The meeting was informed that the European data base for wild species had just acquired an IBM computer (with MS DOS 3.3). The data base prior to this purchase had been incompatible with the equipment of most of the other Institutes and this was a real obstacle to an efficient exchange of data between contributors and the data base.
3. Dr. G. Gal, documentation officer of the data base for cultivated sunflower, reported that he had received since July 1987 amended passport data from the Research Centre for Agrobotany, Tapioszele, Hungary, and passport data together with some characterization and evaluation data from the K. Malkov Institute for Plant Introduction and Genetic Resources, Sadovo, Bulgaria. The Cotton Research Institute, Thessaloniki, Greece, and INRA, Clermont-Ferrand, France, also had sent characterization and evaluation data in addition to the passport data that they had given earlier. Dr. Gal distributed to the participants of the meeting an updated European List of Cultivated Sunflower (working document for restricted circulation version 31 July 1988). This list includes 1400 accessions from 9 countries. He pointed out the necessity for contributors to complete, as far as possible, their passport data, especially for names of accessions (around 40% of registered accessions have no name) and country of origin. Without this information he will not be able to identify potential duplicates. Some participants noted that this list included hybrids or inbred lines. As a result, the meeting decided to clearly redefine (and also extend) the type of material to be dealt with by the data bases/Sunflower Working Group (see recommendations, para. 14).

4. Dr. Seiler, Chairman of the USDA Crop Advisory Committee for Sunflower, provided Drs. Gal and Minaljcevic with a magnetic tape formatted following the recommendations of the ECP/GR Workshop for Exchange of Information (Radzikow, Poland). This tape includes all data (passport, characterization and evaluation) actually available in GRIN for wild and cultivated sunflower (total of 3294 accessions). All wild material from Bushland which had been collected before 1980 has been definitively checked and cross-referenced with a PI number, so that it is now an invaluable reference number to trace back duplicates within wild material and to complete passport data of collections held outside Europe (see para. 12).

The members of the Working Group expressed their appreciation for this very effective collaboration and support of their objectives; they also felt that European curators now had to reciprocate.

Collecting

5. Dr. Seiler informed the meeting of the September 1987 collecting mission in the USA, during which 70 accessions were collected. This mission was organized by USDA-ARS but in accordance with previous agreements, a representative of the ECP/GR programme, in this case, Dr. Marinkovic from IFVC, Novi Sad, was invited to participate and was supported financially by IBPGR. As in the 1985 mission, collected accessions will be halved, one for Ames, Iowa and one for IFVC, Novi Sad, which has the responsibility to distribute on request these samples within Europe. Dr. Seiler explained that following a new USDA policy, accessions could no longer be distributed without receiving a PI number. This explains the delays in sending the 1987 collected material to Novi Sad, as a PI number will be assigned only if it is proved that the collected accessions are alive/multiplied.

List of open-pollinated reference varieties

6. Some progress was achieved during the XII International Sunflower Conference towards the completion of this list. Specialists from Argentina have promised to send a list of their open-pollinated reference varieties with some information on them, whereas specialists in China provided a list of four names. The meeting was of the opinion that more reference varieties existed in China and required more information from this country as well as for Poland and Morocco. It appears that the French reference variety Gris Saintais is quite similar to Gris Strie and therefore this variety was deleted from the list. It was also noted that some confectionary varieties, which were very important as starting points of oil varieties, should be included in this list. In this context, Turkey had been omitted previously and should now be included. The July 1988 version of the List is provided in Appendix III.

Use of a standard reference for evaluation of germplasm

7. Following recommendations of the second meeting of the Group, Dr. F. Vear had sent at the end of 1986 to all participants of the network the inbred line HA89 to be used as a reference for characterization and evaluation of the cultivated germplasm. Experience is now showing that this line is quite sensitive to photoperiodism and therefore not the best choice as a reference line to be used at different latitudes. The meeting agreed on ad hoc action to find a substitute for this line (see para. 19).

Documentation centre for information on wild species

8. The first meeting of the Sunflower Working Group had recommended that IFVC act as a documentation centre for wild species. Subsequently, all participants of the network had sent to IFVC a list of articles/papers dealing with this topic. A bibliography that includes 361 references on wild species of sunflower, was distributed during the meeting. The list, which is reproduced in Appendix IV of the report, is also available under diskette form on request to IFVC.

Base collection

9. A priority had been assigned for the sending of a minimum of 1 kg of seeds of the open-pollinated reference varieties (see Appendix III) to the European sunflower base collection, Agricultural Research Institute, Praha-Ruzyne (RUZYNE), Czechoslovakia. The latter had received the 4 French open-pollinated reference varieties from INRA Clermont-Ferrand, France, one Hungarian from the Research Centre for Agrobotany, Tapioszele, Hungary, and a Spanish one from INIA Córdoba, Spain. It appeared that most countries, e.g. Italy, Hungary, Romania and Yugoslavia are now multiplying their open-pollinated reference varieties and will be able to send these varieties by the end of 1988.

WORKPLAN

Further registration of data

10. The meeting had an open exchange of views in trying to identify the real constraints which could explain the slow rate of registration of data by the two sunflower data bases. Firstly, it was pointed out that the rate could be assessed as slow only in relation to the deadlines assigned by the previous meetings and that achievements until now were far from negligible. It was also noted that in the past the data bases had been circulated mostly in the form of print outs and at quite lengthy intervals, because of software and hardware constraints. The meeting recognized that now the network is adequately computerized and stressed that the data bases are at any time available in the form of diskettes or magnetic tape.
11. In consideration of the above, members agreed on the following procedures to reactivate the process:
 - A. IFVC and CRI will send by September 1988 the content of their entire data bases to all contributors as well as potential contributors (see para. 26).
 - B. The sunflower curators will check the data, correct them when necessary, add any additional characterization and evaluation data in accordance with the additional descriptors selected by the second meeting of the Working Group and return the amended diskettes before the end of 1988 to the respective Institutes acting as data bases.

- C. By April 1989 the two updated versions of the data bases will be sent again, by CRI and IFVC, to contributors in the form of diskettes.
- D. Contributors will return these diskettes with eventual corrections and additional data resulting from the 1989 cropping season by October 1989.

At this stage, such short intervals of exchange of information between all parties were considered as essential. It was agreed that later these intervals could be extended, for example, to a 2-year basis.

- 12. In the case of wild species, the origins from US collections are well defined by PI numbers (see para. 4), consequently the Working Group agreed that the PI number will be used by the data base for wild species as a unique and universal reference number.
- 13. Previously IFVC and CRI had inserted in their data bases a field for availability and non-availability of the material. The meeting agreed to delete this descriptor, which is confusing. Indeed all material registered in the data bases is available, but seeds of some accessions may not be sent immediately due to the need for further multiplication.
- 14. It was felt necessary to redefine the category of material which is dealt with by the Working Group. This consists primarily of wild species, old varieties and landraces and does not include crosses of wild species with breeding material such as cytoplasmic male sterile lines. However, after a lengthy discussion the meeting agreed that inbred lines which are a well-known germplasm source for a specific character (disease resistance, restorer genes, etc.) and which have become public are an integral part of genetic resources sensu lato. Similarly some parents of hybrids, which are not grown any more on a commercial scale, do represent a milestone in the breeding history of sunflower and they should be maintained in genetic resources collections. Data as well as seeds from these parents should be freely available to the network. It was stressed that the Working Group was relying on the expertise of each curator for the selection of this type of material.

15. To implement the above considerations, members recommended that the leader of the data base for cultivated sunflower, Dr. Frank, send in the September diskettes (see para. 11, point 1), a list of the CRI germplasm sources and parents most significant for breeding history together with data on the descriptors which he considers essential. Contributors will reciprocate when returning the diskettes and propose amendments to the format prepared by Dr. Frank, if necessary. It was pointed out that for clarity the data base should be separated into two sections, one for genetic resources sensu stricto and one for inbred lines.
16. The meeting agreed that the list of characterization and evaluation data selected for further registration in the data bases at the second meeting of the Group did not need any extensions, at least at this stage.

The second meeting had not clearly defined how data should be presented for each selected descriptor. In due consideration of the heterogeneity of the populations (for wild species as well as for most of the open-pollinated varieties), the members agreed that the best course would be to provide, at least in the case of wild sunflowers, the data bases with mean and range values of the characters and that the number of years on which the mean had been calculated had to be specified.

Maintenance of wild species

17. The meeting recommended the maintenance of wild species under isolation cages with bee hives or through sib-crossing. However, in some cases one accession of a species may be flowering so late or so early that it is effectively isolated from all other accessions of the same species. If such a practice is followed by the curator, the members recommended that this information be included within the data of the accessions using the code OP (open pollination).

Documentation centre for information on wild species

18. Members recommended that the participants of the network continue to send new references on wild species and that the IFVC return a diskette with all collated references on a yearly basis.

Standard reference for evaluation of germplasm

19. The meeting recommended the following plan of action for the choice of a less photosensitive reference than HA89 and the Chairman, Dr. Fernández Martínez, kindly accepted to take the leadership.
 - A. Contributors will send 50 g of seeds of the line which they consider as best reference.
 - B. Starting January 1989, Dr. Fernández Martínez will study the photosensitivity of these lines through a sowing every 2 weeks in a greenhouse.
20. The meeting recommended that the line HA89 continued to be used until a new reference is selected. It pointed out that the HA89 as well as the new reference should also be used for plant height and days to flowering of wild species.

Further collecting

21. Plans of the US Crop Advisory Committee for Sunflower consist of a collecting mission in the midwestern USA (Wisconsin, Michigan, Illinois, Indiana and Ohio), September 1989, one in 1990 in the Great Plains area (Nebraska, Kansas, parts of Oklahoma, Colorado and Wyoming), and others later on in Mexico and Canada. There was a general consensus on the necessity to continue the previous collaboration. Members asked if IBPGR could extend its support to two specialists from Europe in order to enlarge the expertise.
22. The meeting drew attention to the rapid genetic erosion actually occurring in Morocco, Portugal and Spain, where there is an interesting genetic variability especially of confectionary varieties. Dr. Fernández Martínez had already started in 1986 to collect these in the southern part of Spain and he hopes to be able to continue his action in the north. The meeting recommended that IBPGR stimulate sunflower-collecting missions in Morocco and Portugal.

Rationalization of collections

23. It had been hoped earlier that rationalization of collections would be possible in the near future, but the Group considered that at present it would be premature for only one Institute to take responsibility. In the case of wild species, the effect of drift, especially on annual species, during multiplications in different environments has not yet been well-documented. The production of seed by sib-crossing is difficult and time consuming. If in one place seed production is unsatisfactory it is important that another institute produce seeds. Further, the amount of seeds that each Institute can produce is quite small, so if an important character is found in a particular population, breeders may request seed in numbers exceeding those available from anyone place.

In the case of old cultivated varieties, multiplication is less of a problem, although labour consuming sib-crosses are also necessary (unless strict isolation is ensured). The main problem is the identification of true duplicates. It is at present impossible to be certain that potential duplicates are the same, due to the insufficient descriptive characters in the data base. In conclusion, the Group agreed that multiplication should continue for the next 2 years as at present. This question will have to be reviewed at regular intervals according to the development of seed and genotype maintenance and knowledge of the genetic resources themselves.

Base collections

24. The responsibility was taken by each country to multiply in the best conditions their open-pollinated reference varieties and to send a minimum of 1 kg of seeds to RUZYNE, the base collection for long-term storage and safety duplication. This was judged to be a satisfactory beginning of the rationalization. It was reiterated that beyond this priority, each contributor was also expected to send to the base collection, duplicates of its cultivated germplasm.

Concerning wild species, the recommendation of the second meeting was recalled (only a very limited number of seeds could be sent to the base collection due to low seed set, but it was agreed that 100 seeds would be an absolute minimum).

Other services of European sunflower data bases to breeders/researchers

25. The meeting examined the possibilities for the data bases to provide breeders and researchers with additional services. It was noted that each Institute is conducting its own research which involves genetic resources material. Results are published in scientific papers or proceedings of conferences but the most basic data on genetic resources accessions which are accumulated during these researches are too often lost, at least for other Institutes. It was recommended that these observations on each accession be transmitted to the data bases together with the reference of the publications for further distribution.

Internationalization of the European network

26. In due regard of the collaboration with USDA, members noted that the responsibility of CRI and IFVC to receive and distribute data is not longer confined to Europe. Members agreed that the European sunflower data bases should assume an international role and therefore be named, respectively, the International Data Base for Cultivated Sunflower and the International Data Base for Wild Species. Consequently, diskettes (see para. 11) will, in addition to the European and USA contributors, be sent to all significant collections all over the world with the request to return them with their data.
27. The meeting recognized that governmental institutes had, in most cases, specific collaborations and agreements with private companies holding sunflower collections and that these differ from country to country. It therefore agreed that each country will be responsible to act as an intermediary within its borders and between the international sunflower network and the private companies. If no governmental institutions deal with sunflower genetic resources within a country, where a significant collection is held by private companies, contacts will be established directly by IFVC and CRI.
28. The meeting manifested its willingness to support the development of sunflower breeding and production in developing countries by providing all the services of the data bases. It was also pointed out that in addition to Latin America, interesting collections were held in Kenya and at Mt. Makulu Station, Zambia.

Recommendations on coordination of the sunflower genetic resources network after the end of Phase III of ECP/GR

29. In accordance with the Plan of Operations of Phase III of the ECP/GR, self-sustaining networks should be implemented through the functioning of European crop data bases by the end of Phase III. "At this stage, the procedures for a continuous registration and updating of data in data bases will be routine as well as the flow of information among data bases and from them to active collections. This will allow the continuation of collaborative well-planned and effective activities for collecting, characterization and evaluation as needs arise without the necessity for coordination by a central Secretariat". See General Objectives, Plan of Operations.

Members had been provided with a background paper before the meeting which included the following questions:

- i) Can a self-sustaining network (as defined above) be implemented by the end of Phase III (December 1989)?
- ii) If not, what are the constraints to be addressed for its implementation?
- iii) This concept of a self-sustaining network, as defined in the Plan of Operations, needs to be better defined or modified in order to be applicable for a viable sunflower genetic resources network. What are the other proposals?"

The meeting manifested its self-confidence in the autonomous and self-sustaining network which is being developed by the Sunflower Working Group and in its further expansion. Many members mentioned that this network was complementary to the FAO sunflower evaluation network, but that it should keep its own identity.

Nevertheless, the meeting recognized that the full implementation of such a network is a lengthy process and that they were still at an experimental stage. It was stressed that for the network to be entirely self-sustaining more coordination meetings were needed to review the progress of the work and adapt future workplans following acquired experience.

In conclusion, the Sunflower Working Group recommended that possibilities be explored for the continuation of the programme for at least 2 additional years. The organization of a meeting in early 1990 was considered as vital for identifying new constraints which will emerge in 1988/89, to propose amended procedures when and where necessary and for maintaining the momentum of Working Group activities. The meeting proposed to hold such a meeting in INIA- CNRS, Córdoba, Spain.

The members were grateful for the kind hospitality of Dr. D. Skoric and expressed their appreciation for the short visit to the field of wild collections and breeding material.

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AGENDA

1. Opening Addresses
2. Election of Chairman
3. Adoption of Agenda
4. Review of activities
 - 4.1 Progress of European Sunflower data bases since recommendations of working session held in Szeged on 29 July 1987
 - 4.2 Review of progress on other recommendations issued at the second meeting (Szeged, April 1986)
 - 4.2.1 Collecting
 - 4.2.2 List of open-pollinated reference varieties
 - 4.2.3 Use of a standard reference for evaluation of germplasm
 - 4.2.4 Documentation centre for information on wild species
 - 4.2.5 Base collections
5. Formulation of a workplan
 - 5.1 Registration of further data in data bases
 - 5.2 Identification of redundant duplicates
Commitments from collections for maintenance and distribution of their original material
 - 5.3 Other services of European sunflower data bases to breeders/researchers
 - 5.4 Recommendations for further collecting
 - 5.5 Internationalization of the European network
 - 5.6 Recommendations on coordination of the sunflower genetic resources network after end of Phase III (see introduction paper)
6. Other matters

LIST OF OPEN-POLLINATED REFERENCE VARIETIES

Argentina

15 old varieties to be identified

Canada

Krasnodarets
Peredovik
Saturn
Sunrise

China

Changling
Liao Kui No. 1
Peredovik
Sandaomei

Czechoslovakia

Ducaniska Olejna
Slovenska Siva
Vniimk 6540

Egypt

Giza

France

Gris Strie
Nain Noir
Peredovik
Yssenka

Hungary

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

Iran

10 to be identified

Italy

Abbinia
Ala
Amiata
Argentario
Gianni
Maremma
Tuscania

Morocco

Ciro
Oro

Poland

Wielkopolski
Lek

Romania

Record

Spain

Peredovic (4 or 5 types maintained by different private seed companies)
Smena

USA

Arikara
Havasupai
Hopi
Seneca

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

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

Turkey

To be identified

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