

REPORT OF A WORKING GROUP ON ALLIUM

(fourth meeting) held at

Institut für Genetik und Kontrollanzenforschung

Carlsruhe, Germany

10. and 11. June 1991

EUROPEAN COOPERATIVE PROGRAMME FOR
CROP GENETIC RESOURCES NETWORKS

REPORT OF A WORKING GROUP ON *ALLIUM*

(fourth meeting) held at
Institut für Genetik und Kulturpflanzenforschung
Gatersleben, Germany
10 and 14 June 1991

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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 the CGIAR in 1974. The basic function of IBPGR is to promote and coordinate an international network of genetic resources centres to foster 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, Germany, India, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the UK and the USA, the United Nations Environment Programme and the World Bank

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INTRODUCTION

In accordance with the recommendations of the third meeting of the ECP/GR *Allium* Working Group (Warwick, UK, 5 and 8 September 1988), the Institut für Genetik und Kulturpflanzenforschung (IGK), Gatersleben, Germany, organized the convening of a Symposium on "The Genus *Allium* - Taxonomic problems and genetic resources", 11-13 June 1991 and kindly accepted to host the fourth meeting of the ECP/GR *Allium* Working Group (10 and 14 June 1991) in conjunction with this event.

15 participants attended the ECP/GR meeting; a representative each from Nordic countries, France, Spain, Yugoslavia and USSR had been invited, but were unable to attend. The meeting also benefitted on Friday 14 June of the participation of 5 additional scientists from the Symposium (refer to the List of Participants, Appendix I). Dr. D. Astley was unanimously re-elected as Chairman. The Agenda of the meeting is provided in Appendix II.

REPORT

I. REVIEW OF ONGOING ACTIVITIES

European *Allium* Database

i) *Passport data*

1. In agreement with the recommendations of the third meeting of the Working Group (Wellesbourne 1988), the content of the database was distributed under form of diskettes to all members as well as to USA and to AVRDC. No problems occurred with the reading of the diskettes.
2. Members noted with satisfaction the continued increase of the database files which now amounts to 5,129 accessions (see Appendix III) (3,800 in 1988) and which covers all significant *Allium* collections. However, there are still some isolated *Allium* working collections whose existence is discovered by national *Allium* coordinators and which will have to be included in the network (i.e. *Allium* collection for decorative purposes in UK), whilst other collections continue to evolve and change.

Since 1988 three institutes (Institut für Genetik und Kulturpflanzenforschung (IGK), Germany; Centre for Plant Breeding and Reproduction Research (CPRO-DLO), The Netherlands and Horticulture Research International (HRI), United Kingdom) have provided new computerized files containing amendments of data or increase in numbers, whereas Spain and Bulgaria have been in constant interaction with HRI providing data following order of registration in their own institutes. France had also provided some updated data. During the meeting Ing. Havranek, Research and Plant Breeding Institute of Vegetables, Czechoslovakia (OLOMOUC) gave a new diskette with passport data of all their collections (370 accessions) to the *Allium* database manager. Dr. Kotlinska, Research Institute for Vegetable Crops, Skierniewice, Poland (SKV), also provided an updated diskette.

3. The meeting noted the continuous requirement for upgrading of the data, for example, the preliminary assessment on day length requirement is still lacking in most cases, and there is still a need to transform species names following the standardized taxonomical list agreed by the ECP/GR and edited by Dr. Hanelt. Similarly very few data for latitude and longitude of wild *Allium* ampeloprasum were received by the EADB (see para 20).
4. Dr. Astley asked advice of the Group on the treatment which should be given to data of accessions no longer available in national programmes. It was agreed such accessions should be labelled in the database or kept in a special file, as the data may have some value in the future, either for re-collecting or to accurately assess the degree of erosion in genebanks.
5. It was noted that the files of the EADB were increasingly used for data screening, such requests had been addressed directly to the database manager during the last two years and it appeared that the files of the EADB have also been used in countries with active breeding programmes. Members outlined the possibility for users to search for specific information and to obtain the related material across all the European collections and this was to their

substantial benefit; those users should therefore reciprocate by systematically providing feedback information (including evaluation data) on the use of the germplasm.

ii) *Characterization and evaluation data*

6. The Group reexamined the three lists of minimal characterization and evaluation data (for onion, shallots and close wild relatives; for garlic, pearl onion/great headed garlic; and for leek, kurrat and *A. fistulosum*) which had been developed at the third meeting. There was a consensus that these lists still represented the best possible compromise of the interests of *Allium* curators and users across Europe, and thus efforts should continue on the observation of these characters in each national programme (refer to Appendix IV).
7. The manager of the EADB informed the meeting that the rate of progress was relatively slow, even if such data had been received for some accessions from Bulgaria, the Netherlands, UK, Spain, and Yugoslavia.

Members reviewed the ongoing progress which is summarized below.

The Netherlands:

the back-log of data resulting from ex IVT activities has been computerized and sent to the EADB.

The programme for evaluation of CGN accessions and for grouping near duplicates is progressing well and is just being completed for onions of Northern Europe. By grouping, the original number of 384 accessions will decrease and new CGN accession numbers will be given. Data for this first set of accessions will be sent to the EADB within one year. This programme continues for leeks and for onions from other parts of the world.

Poland:

SKV holds 247 garlic accessions of which 138 are under evaluation (a three-years process). As this exercise started in 1988, numerous data are available which have to be computerized. Dr. Kotlinska promised to dedicate time to this, so that these available data will be sent to the EADB by early 1992. Additional material to be included in the near future include approximately 300 accessions of 100 wild taxa, some collections as yet undetermined, and 117 *A. cepa* accessions (obsolete cultivars from Poland and landraces from USSR).

Czechoslovakia::

Dr. Havranek provided a diskette during the meeting containing passport data for the 870 vegetatively-propagated accessions, and characterization/evaluation data as required by the Working Group for 90% of the garlic and for 60% of the shallots. Members expressed their gratitude for this achievement which will considerably upgrade the content and interest of the EADB.

Ing. Havranek informed the meeting on the actual status of the field genebank (see Appendix V) and of the problems that he is facing up due to heavy infection (mainly viruses) of this vegetatively propagated material. Thus substantial funds are necessary for the proper maintenance of this collection.

Bulgaria:

260 accessions have been evaluated of which the EADB received data for 202 accessions. This work is continuing for the two additional collections (Maritza and Gorna Orahovitz) of which passport data have been received recently.

Greece:

62 of the 97 *Allium* accessions (34 *A. cepa* and 64 *A. ampeloprasum* group leek) held by the Greek Genebank have been evaluated and data will be sent to the EADB after computerization this year. Dr. Samaras informed the members about the loss of *Allium sativum* accessions.

Italy:

Dr. Schiavi of the Research Institute for Vegetable Crops holds a small working collection for breeding purposes and the holdings of the National genebank in Bari are still limited (around 40 accessions) (see para. 18).

Hungary:

Of a total of 456 accessions, 287 are *Allium cepa* including 155 local varieties and 19 of the Aggregatum Group; 89 *Allium sativum* partly stored *in vitro*; 30 *Allium ampeloprasum* and 53 of *Allium fistulosum* and *Allium schoenoprasum*. Considerable data following different descriptor lists are available. Data will be sent to the EADB as soon as they are computerized (hopefully early in 1992).

Germany:

802 accessions are now in the IGK genebank, 30% of which is described in accordance with the minimal descriptor list. These data will be sent to the EADB. In addition, the taxonomic collection of around 1,800 accessions of 200 taxa, is being accessioned gradually to the genebank for long term storage, when relevant and possible. A project is under way for *in vitro* conservation and systematic virus cleaning of the vegetatively propagated material.

Israel:

There are 400 accessions, the majority being indigenous wild material. Of the 110 accessions of vegetatively propagated crops and their progenitors sent to the Israeli genebank by Prof. Rabinowitch from the field genebank only few characterization/evaluation data have been recorded. The Israeli genebank will be contacted by the manager of the EADB which has until now received only passport data. Shortage of funds in this Genebank results in minimal activities aiming at guaranteeing the existence of the material.

UK:

Around 25% of the *Allium cepa* collection have been described in accordance with the minimal descriptor list of the Group. The remaining material will continue to be described, but the completion of this task will take longer than originally anticipated.

(iii) Computerized bibliography

8. Following the 1988 Group decision to develop a bibliography no members of the Working Group had sent any references. A lengthy discussion followed on the rationale of such an exercise, especially when considering the bibliographical services offered by CAB, AGRIS, etc. It was finally agreed that the cost in implementing such a service by the EADB would in no way justify the benefits. Nevertheless, it was recognized that some national genetic resources programmes may have difficulties of access to CAB or other services. It was agreed that specific requests from these programmes should be addressed to the EADB which would then transfer them to the institutes which are in the best position to provide the requested support, i.e. IGK for taxonomy, HRI and CPRO for breeding, etc.

Safety duplications

i) Seeds

9. There was a unanimous agreement on the necessity to continue the efforts for a complete safety duplication of all the material, it was recommended that the EADB identifies through its files the germplasm not yet held by the two base collections, CGN and HRI. Consequently, the curators of the two base collections will contact the managers of collections with germplasm not yet duplicated. Provision will be required to identify the existence of duplicates in the two base collections and the EADB.

ii) *Field genebanks*

10. Drs. Havranek, Rabinowitch and Kotlinska reported on the visit of Drs. Kvanishka and Kotlinska to the Israeli field genebank in March 1990, which was partly sponsored by ECP/GR/IBPGR. Both visitors became acquainted with procedures which are used there, some material was transferred, and they had also the opportunity to attend the three-week International Course on Wild Genetic Resources which was organized by the Hebrew University of Jerusalem.
11. Dr. Havranek informed the meeting that the Olomouc field genebank would soon reach the limit of its capacity (estimated at around 1,000 accessions). Currently 40 accessions are maintained virus-free, as *in vitro* cultures.

Members noted that no other institutes in Europe had offered to act as an additional field genebank, despite the call of the Working Group at its third meeting. However, SKV is helping OLCMOUC informally. In addition, the meeting hoped that the potential for further, financially supported collaboration between the Plant Production Research Institute, Praha-Ruzyne and OLOMOUC would materialise, as this would greatly reduce the backlog.

12. Prof. Rabinowitch intends to visit the OLOMOUC genebank in August 1991. Members recommended that this opportunity be taken by the field genebank curators to produce a brief manual for guidance on the transfer of vegetative material to them, as well as defining their real capacities, with time scale, to virus-index the material, clean and distribute it. It was also recommended that the curator of SKV, Dr. T. Kotlinska, who is providing maintenance assistance to OLOMOUC, joins the visit. Finally, it was also outlined that more support was needed for the continued activities of both field genebanks.

II. WORKPLAN

Promotion of the Working Group activities

13. Members were eager to establish links and interactions with all parties interested in *Allium* genetic resources, and to widen as far as possible the membership of the network. One of the best ways to become known is to publish articles or papers on the activities of the group. Different journals were mentioned such as the new *Allium* Improvement Newsletter edited by P. Simons, the Onion Newsletter for the Tropics edited by L. Currah and F.G. Proctor. It was also agreed that an article on the conclusions of the fourth meeting of the Group would be submitted to Diversity, as well as one on the Symposium on The Genus *Allium* - Taxonomic Problems and Genetic Resources.
14. Being aware that the Group will most likely be unable to meet before 1993 or 1994, members agreed that the publication of an informal newsletter on a biannual basis would encourage information flow and exchange. A constant flow of information between members of the Group will permit amendment and development of its strategies between meetings. This informal newsletter will thus include any news that members wish to share on their progress, constraints and travels, as well as official communications from the Chairman or from IBPGR on development within ECP/GK.

It was recommended that the first issue be distributed by end of 1991, for the second to follow by June 1992, and so on. It was also recommended that the Chairman as editor send to all participants a request for provision of news eight weeks before distribution.

The European *Allium* Database

15. In view of the considerable increase in the content of the EADB, the meeting recommended that new diskettes, including all files of the EADB, be distributed to members of the Working Group by spring/summer 1992. It is accepted that these data on diskettes will be available to any other national programme or institution on request.
16. Members agreed to increase their efforts for sending data (cf. para 7) from their national programmes to the EADB in order that the distributed product be as comprehensive as possible.
17. The Working Group hopes that other institutions working outside Europe and receiving the EADB files will reciprocate by sending their data to HRI so that gradually an international *Allium* database can be built up.

Collecting

18. The Group reviewed the recommendations issued in its third meeting and the action taken. The following conclusions were drawn:

i) EC countries:

Greece:

collecting of garlic is strongly recommended. Dr. S. Samaras informed members of the plans of the Greek Gene Bank to initiate such collecting in the Peloponnese in 1991. It is hoped that collecting missions could be continued in 1992 and subsequent years.

Italy:

urgent action is still needed. Dr. Schiavi (Research Institute of Vegetable Crops, Montanaso Lombardo) promised to undertake a collecting mission after consultation with the National Genebank in Bari. In view of the collaboration between Bari and IGK for collecting, Dr. Hanelt will provide him with detailed information on the material collected already.

Spain:

there may be a need for collecting additional material of wild species. The Chairman will contact Dr. Ochoa of Zaragoza to clarify the situation.

ii) Nordic countries:

no information was available on the collecting of shallots, potato onions and chives in Sweden. It was recommended that the Chairman contacts directly the Nordic Gene Bank for further information on action taken since the third meeting.

iii) Cyprus and Turkey:

the diversity of cultivated and wild material is yet to be collected in these two countries and, therefore, the necessity to establish better contacts between the *Allium* specialists from these two countries and the members of the Group was reiterated.

iv) Albania and Romania:

attention was drawn to the potentially valuable landraces from Romania and Albania, which may have specific forms, and it was agreed that more information should be sought from those two countries.

v) USSR:

Dr. Kotlinska informed the meeting about the 1988 *Allium* germplasm collection in the Soviet Union in which an international team of five scientists, including herself, was involved. 83 *Allium* accessions from 32 species, among other *A. praemixtum*, *A. vavilovii*, *A. pskemense* and *A. longicuspis*, were collected. Ing. Havranek provided valuable information on genetic erosion in the Soviet Central Asia and West Siberia which is reproduced in Appendix VI.

Members outlined the need for further collecting in those regions and strongly recommended systematic collecting which could be undertaken by local experienced botanists and plant breeders (see ecogeographical surveys, para. 21)

vi) Other parts of the world:

China:

The Group was eager to receive more information on material which has been collected in this country and especially from the western part. Further contacts were recommended and the good offices of the IBPGR Regional Coordinator for East Asia were requested.

Cuba:

Dr. M. Esquivel from Instituto de Investigaciones Fundamentales en Agricultura Tropical "Alejandro Humboldt" (INIFAT) presented an overview of the *Allium* situation in Cuba and asked for IBPGR support. Historically, 222 *Allium* accessions have been collected, showing interesting variability, especially in the shallot group, in bulb shape, colour, disease resistance and flowering ability. The following taxa are cultivated: *A. cepa*, *A. sativum*, *A. ampeloprasum*, *A. fistulosum*, *A. schoenoprasum*, *A. chinense* and *A. tuberosum*. There are also species resembling *A. canadense* (which is found only wild in the USA). Unfortunately, many of the accessions have been lost in the past years due to unfavourable weather conditions. However, passport information, including site information, are available and material could be re-collected from original sites.

Members recommended IBPGR support for this re-collection and Prof. Rabinowitch expressed his willingness to contribute to the preservation of the valuable Cuban material by maintaining duplicates in Israel.

19. Lesley Currah outlined the status of onions in the tropics based on the survey published in the NRI Bulletin No 35 "Onions in tropical regions". There is likely to be a rapid expansion by multinational seed companies into cultivar development in short-day onions. The existing locally-developed genetic resources of onion and shallot in the tropics are likely to be depleted very rapidly, once seed of tropically-adapted improved cultivars becomes available. Hybrid seed is already being sold in some areas of the tropics. There are still opportunities to collect landraces of onion and shallot in parts of the tropics, most notably in India, Pakistan, Bangladesh, West and Central Africa, and the highlands of Central and South America.

The material should be collected for conservation and evaluated, and where possible maintained in its area of development. Some work is under way in Indonesia. There is room for improvement in tropical onions but many local selections exhibit valuable characters such as heat resistance, ease of flowering and a long bulb dormancy at high temperatures. The questionnaire results showed rapid changes taking place in the development of tropical onions with many traditional selections being displaced. A concerted effort is required to collect and conserve this material for future scientific developments.

Ecogeographical surveys

20. The Group re-examined the value of *A. ampeloprasum* as a pilot taxon for mapping of species distribution. Prof. Stearn of Kew Botanic Gardens, informed members that during his 20 years of collecting in Greece, he never noted any erosion of this taxon, which is a weed associated with vineyards. However there is undoubtedly a considerable variation within *A. ampeloprasum* and there is an interest to better understand its cyto geography, which could be associated with a migration from East to West. Attention was drawn to *A. babingtonii* (a taxon to be included in *A. ampeloprasum*), occurring in Ireland, especially Conemara, and in South-West United Kingdom, the extreme North-West limit of *A. ampeloprasum*.

Members duly noted that there were many data recorded on distribution and population statistics accumulated during taxonomic exploration which are available in national herbaria. They recommended that delegates to the Symposium on *Allium* Taxonomy be approached by the EADB with the request for data on distribution for *A. ampeloprasum* in the development of an ecogeographical map.

21. There was a consensus that detailed ecogeographical surveys were required in Soviet Central Asia and Western Siberia (see para 13 iv) with the aim of *in situ* preservation of the material, preferably in reserves/territories already protected.

The Group recommended further preliminary individual contacts by the Chairman with local scientists in accordance with a mailing list to be provided by Ing. Havranek, together with official contacts with VIR and other adequate institutions by IBPGR. The Group drew attention to international organizations which may be concerned on *in situ* conservation, including IBPGR, on the need to support such ecogeographical survey in this region.

Evaluation

22. Prof. Rabinowitch made a plea for further evaluation of the genetic resources through collaborative projects in order to enhance their use. He proposed that material be screened for pest and disease resistances, under natural infestation in hot spots. Lengthy discussions followed on merits of natural infestations, genotype x environment interactions, as well as the occurrence of diverse races of diseases in different regions. It appeared above all that additional funds would be necessary for such studies and that the sponsoring of such exercises by donors was far from ensured. It was also noted that *Allium* breeding was actually in great part dealt with by private firms and this raised further questions on the need for public sector evaluation of genetic resources collections. Finally, it was pointed out that phytopathologists in the UK and the Netherlands had done large screenings on *Allium* germplasm in the 70s and

early 80s, but the attempts to include resulting data from the screened material into a genebank database had been rather unsuccessful. The Group agreed that its primary responsibility was to ensure that feed-back information was sent by any user receiving genetic resources.

23. The Group considered that better knowledge of the genealogy of open-pollinated varieties would enhance their intrinsic value. Dr. Havey informed the Group of the efforts of the USDA Bulb and Root Crop Advisory Committee to re-collect old varieties and to trace back their genealogies. Dr. Kotlinska, who has started similar work for Polish varieties, agreed to finalize it and to send it to the Chairman for further distribution. Its publication in the IBPGR Newsletter was also recommended. Other members are encouraged to carry out a similar task in their respective countries and to draw the EADB attention to any publications providing such information.

Research

24. The ways to stimulate further research activities for better understanding of the genetic diversity were discussed at length. Referring to papers presented in the Taxonomy Symposium and especially to the "Molecular Phylogenetics of cultivated and wild *Allium*" by Havey and to "Introgression of characters from *Allium roylei* Stearn in *A. cepa* L." by de Vries and others, members recognized the need for researchers to obtain accessions of wild *Allium*, with source and origin precisely known and taxonomic identification certified.

Therefore, the Group recommended the implementation of sets of accessions for each wild species which is assumed to be progenitor or related to cultivated *Allium* crops. These sets, will be distributed to specialists studying phylogeny or genetic diversity of *Allium* as standard reference material, allowing a meaningful comparison of diverse research results. It was agreed that the first reference set of accessions would be constituted by the material sent from IGK to Dr. Havey, and other researchers, whose RFLP studies on chloroplast and ribosomal genomes are of great interest. Consequently, Dr. Hanelt agreed to initiate the necessary validation of the reference accessions through interactions with concerned researchers.

25. In consideration of the constraints faced by field genebanks (refer to paras. 10 to 12) and of the fact that *in vitro* material can be maintained in safe conditions for only one year and a half, members called for intensification of research on *in vitro* maintenance methods, especially on cryopreservation, for *Allium*.

Genetic stocks

26. It was recognized that due to the low breeding status of *Allium* compared to easier crops such as barley or sunflower in ECP/GR, there were yet few genetic stocks and that those were not yet freely available due to the considerable investment in staff and expertise for their constitution.

The Group agreed that the maintenance of genetic stocks (differential lines, source populations, etc.) is an international duty of *Allium* genetic resources collections, as soon as those genetic stocks become available for distribution.

Future of the ECP/GR *Allium* Working Group

27. Members draw attention of their Governments to the continued funding which is required for proper maintenance of *Allium* genetic resources and their use. The maintenance and enhancement of the germplasm can only be executed meaningfully within the full inter-country collaboration with sharing of responsibilities, as initiated and developed in the ECP/GR *Allium* Working Group. They strongly hoped, therefore, that their Governments, being fully aware of the necessity of this European collaboration, will continue to provide scientists with the means to meet regularly for review and extension of their activities.
28. Members emphasized that meetings of managers of *Allium* genetic resources collections which are combined with other *Allium* meetings such as the Symposium on the Genus *Allium* organized by IGK, are highly beneficial to all parties. They recommended therefore that the next meeting be combined with the 5th EUCARPIA *Allium* Symposium. It was agreed that this matter would be developed and discussed within the informal newsletter of the Group (refer to para. 14).

International collaboration

29. Participants agreed that an international *Allium* genetic resources network may, at least at this stage, appear unrealistic considering the constraints and requirements in different regions, and variance of interests in short and long-day material.

The Group is fully aware of the need to support the *Allium* production in developing countries with the parallel requirement to avoid the genetic erosion or extinction of valuable genetic resources. They called for the implementation of a genetic resources *Allium* tropical network (or networks) and recommended IBPGR sponsorship. The ECP/GR *Allium* Working Group expressed its willingness to provide, in the extent of its possibilities, all support for helping other networks to take shape and to develop. Dr. L. Currah informed the Group of an international Symposium on tropical onions to be held tentatively in Thailand in 1993; members recommended IBPGR to sponsor a representative of the ECP/GR *Allium* Working Group to participate in this Symposium and to present a discussion paper on advantages of networking *Allium* genetic resources, and to offer the collaboration of the ECP/GR *Allium* Working Group.

Vote of thanks

The Group wished to express its deep gratitude to Drs. Hanelt and Hammer and to all other staff of IGK for hosting the ECP/GR meeting and for the excellent organization of the highly appreciated Symposium on the Genus *Allium*.

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APPENDIX II

AGENDA

Opening Addresses

Election of Chairman

Adoption of Agenda

I. Review of the activities since the third meeting

1. European *Allium* database

- 1.1 Distribution of the European *Allium* database (whether computerized or manual form)
- 1.2 Updating of the data base (passport data), e.g. status of accessions, geographical coordinates for *Allium ampeloprasum*, preliminary assessment on day length requirement, etc.
- 1.3 Documentation of collections of the minimal list of characterization/evaluation descriptors selected by the second meeting
 - a) Data received by the European *Allium* database
 - b) Achievements from curators

1.4 Computerized bibliography

2. Review of progress in collecting

3. Safety duplication

- 3.1 Base collections
- 3.2 Field genebanks

4. Review of progress on other recommendations of the third meeting

II. Workplan

5. Collecting

6. Ecogeographical surveys

7. Further services in the context of the European *Allium* databases, e.g. establishment of genealogies for recent cultivars, establishment of a reference list of old varieties, etc.

8. Collaborative projects for the enhancement of *Allium* genetic resources, i.e. description/study of the genetic variation of some species, evaluation/screening, etc.

9. Position and support of the ECP/GR *Allium* Working Group towards an international *Allium* genetic resources network
10. Next meeting of the *Allium* Working Group
11. Other matters
12. Writing of report
13. Consideration of report and approval by the Working Group

APPENDIX III

STATUS OF THE EUROPEAN *ALLIUM* DATABASE

	<i>A cepa</i>	<i>A ampeloprasum</i>	<i>A sativum</i>	<i>A fistulosum</i>	Others	Total
AUTBVAL	3					3
AUTWIEIPP			30			30
BGRIIPR	106	25	7		19	157
BGRGORNA			203			203
BGRPLOVDIV			99			99
CHERAC	15	19				34
CSKOLOMOUC	52		149		19	220
DDRGAT	178 (1)	70 (4)	242 (6)	57 (3)	744 (28)	1291 (42)
DEUBGRC	11	4			4	19
ESPDGAZARA	38					38
ESPPOLVAL	100	7	73			180
FINHELS'IGU	99					99
FRAENSHVER	140					140
FRAINRAVAP	96	18			2	116
GBRIHRGRU	901	85	3	53	137	1179
GRCGGB	37	59	14			110
HUNRCA	157	9	39	5	6	216
ISRIGB		23			197	220

	<i>A cepa</i>	<i>A ampeloprasum</i>	<i>A sativum</i>	<i>A fistulosum</i>	Others	Total
ITAIDG	46	3	5		9	63
ITAUNIPAC			2			2
NLDHORWAG	187	78				265
POLSKV	59		118	1	141	319
PRTEAN	7					7
PRTNUMI	20	1				21
REGNGB	21					21
TURARARI	40	28	1			69
YUGIFVC	8					8
TOTAL	2321 (1)	429 (6)	985 (6)	116 (3)	1278 (28)	5129 (42)

Table I. Summary of *Allium* Collections Registered in the European Database
 () numbers represent accessions lost but data remain in database.

**APPENDIX IV FURTHER REGISTRATION OF CHARACTERIZATION
AND EVALUATION DATA IN THE EUROPEAN DATABASE**

**Minimum data to be provided for onion, shallot and close wild relatives;
garlic, pearl onion and great headed garlic;
leek, kurrat and *Allium fistulosum***

A set of descriptors to be provided to the European *Allium* database was selected, respectively, for onion, shallot and close wild relatives; garlic, pearl onion and great headed garlic; leek, kurrat and *Allium fistulosum*. The full list of required descriptors is provided in this Appendix for each group and their definitions are given in full.

The data sent to the database should preferably be in accordance with the definition of descriptors in the IBPGR descriptor list. If data are recorded in another form, the definition of the descriptor states used should be clearly specified.

Characterization data should be recorded by the active collections and evaluation data should be obtained by the active collections from breeders.

Any additional information on the accessions will be welcome by the European databases, especially with regard to information on susceptibility to pest, diseases and stress conditions.

Minimum data to be provided for any other *Allium* species

Only passport data must be provided. Any other available data will be welcome by the European database, especially with regard to information on susceptibility to pests, diseases and stress conditions.

**Minimum data to be provided for onion, shallot and close wild relatives
(*A. altaicum*, *A. farctum*, *A. galanthum*, *A. praemixtum*, *A. pskemense*,
A. oschaninii, *A. vavilovii*)**

CHARACTERIZATION AND PRELIMINARY EVALUATION

3.1 COUNTRY OF CHARACTERIZATION AND PRELIMINARY EVALUATION

3.2 SITE (RESEARCH INSTITUTE)

3.3 NAME OF PERSON IN CHARGE OF CHARACTERIZATION

3.4 SOWING DATE

3.4.1 Day

3.4.2 Month

3.4.3 Year

3.5 HARVEST DATE

3.5.1 Day

3.5.2 Month

3.5.3 Year

4.1.3 Leaf erectness

3 Prostrate

5 Medium

7 Erect

4.1.9 Nature of storage organ

1 Bulb, single

2 Aggregated bulbs with common basal plate (shallot)

3 Rhizomes

4 Cloves

5 Foliage leaf bases

6 Bulb complex enclosed in communal skin (multiplier onion)

7 Other (specify)

4.1.10 Shape of full-grown bulbs (see Fig. 1)

1 Flat

2 Thick flat

3 Fat globe

4 Globe

5 High globe

6 Spindle

7 Cylinder

8 Flat top

9 High top

10 Rhombic

- 11 Broad obovate
- 12 Broad elliptic
- 13 Ovate
- 14 Elliptic
- 15 Bottle

Bulb shape states 10 to 15 are reproduced from UPOV T6/46/3 as the Working Group felt that these specific shapes could not be transcribed in the shapes as defined by IBPGR (descriptors 1 to 9)

4.1.11 Uniformity of bulb shape

- 0 Irregular
- + Uniform

4.1.12 Bulb skin colour

- 1 White
- 2 Yellow
- 3 Light brown
- 4 Brown
- 5 Dark brown
- 6 Red
- 7 Green (chartreuse)
- 8 Yellow and light brown
- 9 Light violet
- 10 Violet
- 11 Mixed populations (specify)
- 12 Other (specify)

4.2.2 General fertility

- 1 Sterile
- 2 Male sterile
- 3 Female sterile
- 4 Fertile

4.2.6 Mode of reproduction

- 1 Vegetative
- 2 Seed
- 3 Both

FURTHER CHARACTERIZATION AND EVALUATION

Country of further characterization and evaluation, site, name of person in charge of further characterization, sowing data and harvest date (descriptors 5.1 through 5.5) to be provided only if data different from 3.1 through 3.5.

5.6 STANDARD CULTIVARS

The applied characteristics to be scored require standardization by comparison with recognized cultivars. The standard cultivars used will be constant at a given evaluation site or named group of sites. Different *Allium* crops will require a range of standard varieties for each site or group of sites

5.6.1 Cultivar 1

5.6.2 Cultivar 2 etc.

6.1.1 Bulb skin thickness

- 3 Thin
- 5 Medium
- 7 Thick

6.1.2 Bulb flesh colour

- 1 White
- 2 Green/white
- 3 Yellow
- 4 Red/white
- 5 Other (specify)

6.1.7 Dry matter content of storage organs

Dry matter content (g) should be determined by a refractometer reading on an average of 10 bulbs

6.1.8 Storage life of storage organs

The length of storage life will depend on the temperature of the store. The temperature of this store during storage life trials should be recorded. Storage organs of uniform size and free from bruises, pests and diseases should be used for the trials. The test should be conducted on 5 replications each consisting of 50 units each. A control variety will be included in the test system. The storage life will be assessed as the number of weeks from 100% top fall to 50% breakdown of storage organs. Bulb with storage roots to be discounted and the sprouting expressed as a percentage of the original number minus the number of rotted bulbs. The storage life to be presented in numbers of weeks.

6.2.3 Time of flowering relative to a standard variety

The standard variety and test accessions should be planted at the same time. The commencement of flowering should be recorded for the test relative to the standard. The data to be presented as (-3) i.e. three weeks earlier, or (+2), two weeks later than the standard.

6.2.4 Day length requirement

The measurement of maturity time will give an indirect estimation of day length requirement.

The recommended procedure for determination of day length requirement of a genotype is: a standard control cultivar should be grown with the test accession at a standard plant density and the response of the test genotype to day length assessed

when 50% of the test plants have fallen tops. These data should be related temporally with a similar stage in the control variety. The data to be recorded as plus or minus the number of days to designated lateness or earliness in comparison with the standard, i.e.

+20 = the test accession exhibited 50% fallen tops 20 days before a similar stage in the control

-15 = the test accession exhibited 50% fallen tops 15 days before a similar stage in the control

6.2.6 Cold requirement for bolting

Accessions should be tested relative to a control cultivar. The average degree of bolting of the control and the test accession to be recorded as a percentage. The relative amount of bolting will be calculated as a ratio of the amount of bolting in the control cultivar ($\% \text{ test} \times 100/\% \text{ control}$).

This index will serve to identify the cold requirement for bolting in developmental and introduced material. It may be necessary in certain locations to have several staggered sowing dates to fully assess this character.

Minimum data to be recorded for garlic (*A. sativum*) and pearl-onion/great headed garlic (*A. ampeloprasum*)

CHARACTERIZATION AND PRELIMINARY EVALUATION

3.1 COUNTRY OF CHARACTERIZATION AND PRELIMINARY EVALUATION

3.2 SITE (RESEARCH INSTITUTE)

3.3 NAME OF PERSON IN CHARGE OF CHARACTERIZATION

3.4 SOWING DATE

3.4.1 Day

3.4.2 Month

3.4.3 Year

3.5 HARVEST DATE

3.5.1 Day

3.5.2 Month

3.5.3 Year

4.1.3 Leaf erectness

3 Prostrate

5 Medium

7 Erect

4.1.7 Presence of bulbils (topsets)

- 0 Absent
- + Present

4.1.12 Bulb (clover) skin colour

4.1.12.1 Outer skin colour of compound bulb

4.1.12.2 Skin colour of the clove

1	White
2	Yellow
3	Light brown
4	Brown
5	Dark brown
6	Red
7	Green (chartreuse)
8	Yellow and light brown
9	Light violet
10	Violet
11	Mixed populations (specify)
12	Other (specify)

4.1.14 Number of cloves/compound bulb

1	1
2	2-10
3	11-15
4	16-20
5	> 20

4.2.7 Ability to produce scape

0	Scape absent
1	Enclosed in bulb
2	Extended with flower only
3	Extended with topset
4	Heterogeneous (topset, flower buds)

FURTHER CHARACTERIZATION AND EVALUATION

Country of further characterization and evaluation, site, name of person in charge of further characterization, sowing data and harvest date (descriptors 5.1 through 5.5) to be provided only if data different from 3.1 through 3.5.

5.6 STANDARD CULTIVARS

The applied characteristics to be scored require standardization by comparison with recognized cultivars. The standard cultivars used will be constant at a given evaluation site or named group of sites. Different *Allium* crops will require a range of standard varieties for each site or group of sites.

5.6.1 Cultivar 1

5.6.2 Cultivar 2 etc.

6.1.2 Bulb clove flesh colour

- 1 White
- 2 Green/white
- 3 Yellow
- 4 Red/white
- 5 Other (specify)

6.1.8 Storage life of storage organs

The length of storage life will depend on the temperature of the store. The temperature of this store during storage life trials should be recorded. Storage organs of uniform size and free from bruises, pests and diseases should be used for the trials. The test should be conducted on 5 replications each consisting of 50 units each. A control variety will be included in the test system. The storage life will be assessed as the number of weeks from 100% top fall to 50% breakdown of storage organs. Bulb with storage roots to be discounted and the sprouting expressed as a percentage of the original number minus the number of rotted bulbs. The storage life to be presented in numbers of weeks.

6.2.4 Day length requirement

For *A. sativum* maturity time should be observed when 50% of health plants show dropping and yellowing of lower leaves.

The recommended procedure for determination of day length requirement of a genotype is: a standard control cultivar should be grown with the test accession at a standard plant density and the response of the test genotype to day length assessed when 50% of the test plants have fallen tops. These data should be related temporally with a similar stage in the control variety. The data to be recorded as plus or minus the number of days to designated lateness or earliness in comparison with the standard, i.e.

+20 = the test accession exhibited 50% fallen tops 20 days before a similar stage in the control

-15 = the test accession exhibited 50% fallen tops 15 days before a similar stage in the control

7.1 SUSCEPTIBILITY TO LOW TEMPERATURE

Minimum data to be recorded for leek and currat (*A. ampeloprasum*) and *A. ampeloprasum*

CHARACTERIZATION AND PRELIMINARY EVALUATION

3.1 COUNTRY OF CHARACTERIZATION AND PRELIMINARY EVALUATION

3.2 SITE (RESEARCH INSTITUTE)

3.3 NAME OF PERSON IN CHARGE OF CHARACTERIZATION

3.4 SOWING DATE

- 3.4.1 Day
 3.4.2 Month
 3.4.3 Year

3.5 HARVEST DATE

- 3.5.1 Day
 3.5.2 Month
 3.5.3 Year

4.1.1 Foliage colour

- 3 Light green
 5 Medium
 7 Dark green

4.1.3 Leaf erectness

- 3 Prostrate
 5 Medium
 7 Erect

FURTHER CHARACTERIZATION AND EVALUATION

Country of further characterization and evaluation, site, name of person in charge of further characterization, sowing data and harvest date (descriptors 5.1 through 5.5) to be provided only if data different from 3.1 through 3.5.

5.6 STANDARD CULTIVARS

The applied characteristics to be scored require standardization by comparison with recognized cultivars. The standard cultivars used will be constant at a given evaluation site or named group of sites. Different *Allium* crops will require a range of standard varieties for each site or group of sites.

- 5.6.1 Cultivar 1
 5.6.2 Cultivar 2 etc.

6.1.4 Length of leaf sheath

The length (mm) to be measured from the stem base to the outer lamina notch.

6.1.5 Median diameter of the leaf-base pseudostem

The diameter to be measured in millimetres at the median point between the stem base and the outer lamina notch.

6.2.6 Cold requirement for bolting

Accessions should be tested relative to a control cultivar. The average degree of bolting of the control and the test accession to be recorded as a percentage. The relative amount of bolting will be calculated as a ratio of the amount of bolting in the control cultivar ($\% \text{ test} \times 100/\% \text{ control}$).

This index will serve to identify the cold requirement for bolting in developmental and introduced material. It may be necessary in certain locations to have several staggered sowing dates to fully assess this character.

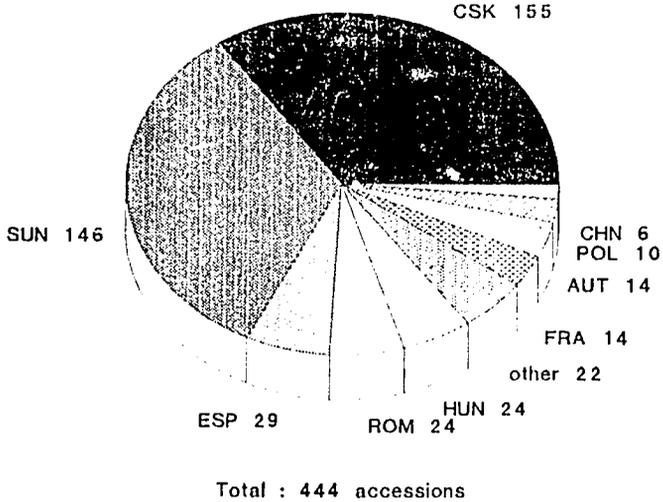
7.1 SUSCEPTIBILITY TO LOW TEMPERATURE

7.2 SUSCEPTIBILITY TO HIGH TEMPERATURE

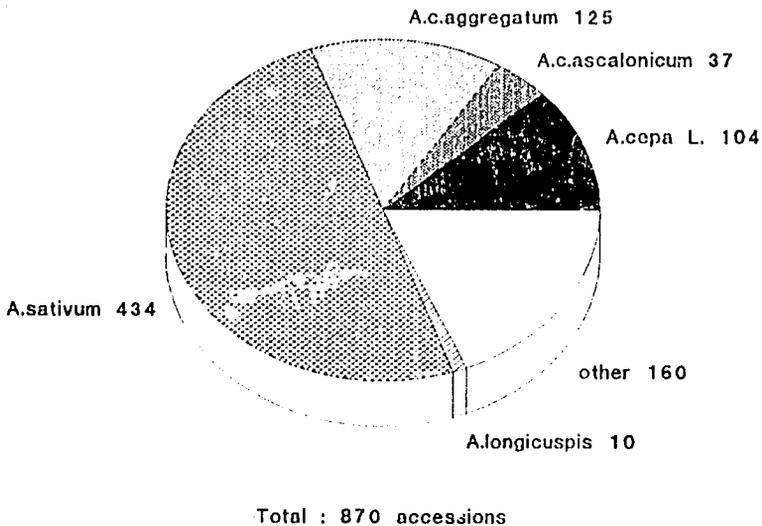
APPENDIX V

**ALLIUM FIELD GENE BANK, OLOMOUC:
STATUS OF THE COLLECTION**

ALLIUM FIELD GENE BANK, Olomouc, CSK, 1991
Origin of A.sativum & A.longicuspis



ALLIUM FIELD GENE BANK, Olomouc, CSK, 1991
Number of accessions



**APPENDIX VI THE STATUS OF *ALLIUM* GENEPOOL
IN SOVIET CENTRAL ASIA AND WEST SIBERIA (1988-1990)**

Genetic diversity in onion landraces of Central Asian genecenter is seriously endangered due to highly selected modern cultivars and hybrids.

At the market places in Osch, Dushanbe, Frunze and Samarkand some market-man, coming here from distant and isolated foot-hill and mountain areas, sell the seeds of primitive onion landraces. They informed us that these onions have been traditionally maintained in their regions since immemorial time.

On the other hand, in the same markets, great lots of onion of local origin are sold, showing remarkable variability in shape as well as in colour, as a consequence of free pollination by foreign mediterranean cultivars, mainly from Spain.

Plant breeders who were contacted there consider the Spanish Yellow Globe and the Spanish White as most suitable resources for improvement of landraces.

Populations of wild *Allium*

Localities of wild *Allium* populations situated in mountain regions of Central Tian-Shan, Pamiro-Alaj and Siberian Altai are devastated by extensive pasture up to high altitude. The plant on sheer slopes are damaged owing to scraping off the slope vegetation (*Prangus*, *Vitis*), which is used for drying as a fodder. Some species like *A. pskemense*, *A. galanthum* and *A. altaicum* are favoured as valuable vegetables by local inhabitants. Giant bulbs of *A. afiatunense* are picked up in great quantities for conservation via milk fermentation.

Poor *Allium* populations in open landscape are in sharp contrast with dominant occurrence of *Allium* on subalpine meadows in state protected reserves (e.g. Aksu-Djabaglu, *A. caesium*, *A. caruleum*), where grazing was prohibited 20 years ago. Similar situation is in Altai reservation (*A. altaicum*, *A. sibiricum*, *A. nutans*).

Admission to the reserve is strictly regulated, but groups of university students practise here regularly. This seems to be an ideal situation for realization of *in situ* germplasm protection projects and for establishing introduction sites here.

Local institutions

Local research institutes are well-equipped for expedition activities and collection missions.

On the other hand, the material gathered gradually disappears in collections of rather low technological level. Curators of these collections are constrained to look for short-term effect only.

Safety

In all the Soviet Central Asia and Siberia the accessibility to genecenters has worsened very much due to serious political instability. Any activity in are is possible only under skillfull organization support from local research authorities. However, even under these circumstances, the highly developed local bureaucracy may induce collaps situation and material losses.

Conclusions and proposals

The areas of Asian *Allium* genecentres on the USSR territory are extremely important for global *Allium* gene pool strategy. At present, the *Allium* genetic resources are critically endangered here.

We propose:

1. To engage local experienced botanists, plant breeders and other specialists in the *Allium* Working Group activities and support them with some financial funds.
2. Under cooperation with some European groups, to organize international missions oriented on *in situ* protection of *Allium* germplasm, preferably to reservations and territories protected.
3. To supply European collections with duplicates of samples and organize the international access to them for other specialists.