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**Report of a
Working Group
on Oat**

**Held in
Menemen,
Turkey
25-27 Sept. 1984**

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



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

Oat Working Group:

REPORT

of a Working Group held at the Aegean Regional
Agricultural Research Institute, Menemen, Izmir,
Turkey, 25-27 September 1984

UNDP-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). The IBPGR was established by the CGIAR in 1974 and its Executive Secretariat is provided by the Food and Agriculture Organization of the United Nations. The basic function of the IBPGR is to promote and coordinate an international network of genetic resources centres to further the collection, conservation, documentation, evaluation and use of plant germplasm and thereby contribute to raising the standard of living and welfare of people throughout the world. The Consultative Group mobilizes financial support from its members to meet the budgetary requirements of the Board.

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INTRODUCTION

The European Cooperative Programme for the Conservation and Exchange of Crop Resources (ECP/GR) is organized in the form of crop working groups and six have been designated for the Programme, namely, Barley, Prunus, Forages, Allium, Sunflower and The Oat Working Group was convened from 25-27 September 1984, on the invitation of the Director of the Aegean Regional Agricultural Research Institute (ARARI), Izmir, Turkey. A list of participants is shown in Appendix I.

The participants were welcomed to ARARI and briefed on the activities of the Institute by the Director, Dr. K. Temiz.

A brief review of the ECP/GR programme and a definition of the purpose and objectives of the meeting were provided by Mr. P.M. Perret of the ECP/GR Secretariat.

The meeting elected Dr. J.H.W. Holden as Chairman of the Working Group.

The agenda, as approved, is shown in Appendix II.

REPORT

1. The Working Group reviewed the data on the major collections of oats in Europe (Appendix III). This data was derived from replies received in response to a questionnaire sent out by the ECP/GR Secretariat. It was recognized by the Working Group that this information was incomplete, although the most important collections of wild species included. Additional items of information from Belgium, Israel, Turkey, the United Kingdom and Yugoslavia were tabled at the meeting and have been added to that given in Appendix III. The importance of collections located outside Europe, such as the one at Beltsville, U.S.A., and The Plant Gene Resources of Canada (PGRC) at Ottawa, Canada, was stressed in that they may contain material from European landraces which is not represented in any collections in Europe. In addition the PGRC has a very valuable collection of wild species.

2. The availability and extent of passport and characterization data were discussed. The major collections usually have passport data on their accessions, but it is known that some breeders' collections have very few passport data (in some cases limited to accession number and name of cultivar).

This situation provides a strong indication that the material in these collections is derived from seed exchange.

The Working Group recognized that the lack of characterization data in most oat collections was a serious problem. In the opinion of the meeting only the Nordic Gene Bank (NGB) and the Institute of Plant Introduction and Genetic Resources 'K. Malkov' Sadovo, Bulgaria, have extensively characterized their accessions. The Welsh Plant Breeding Station (WPBS), Aberystwyth, U.K., has partial characterization data.

3. The Working Group also noted that valuable material has been disappearing from collections during the past decade due either to inadequate cold storage facilities, absence of regeneration, or to lack of motivation of the breeders to keep germplasm which is not of immediate interest for them.

4. The Working Group recognized that action was urgently needed to achieve better conservation, characterization and documentation of oat collections. It was agreed that the first step to fulfilling this objective is the production of a European preliminary catalogue based on minimum passport data.

5. The meeting took into consideration that for the rapid implementation of this catalogue, as few passport data as possible should be requested from curators of collections consistent with the need to use the data for the identification of obvious duplicates.

Consequently ten passport descriptors were selected and recommended for use for the production of a list of unique European accessions. These basic passport data are shown in Appendix IV.

6. Different approaches for obtaining a rapid return of requested basic passport data to a data base were examined. In consideration of the active links of members of the Working Group with colleagues from other countries it was agreed that members would liaise with curators of oat collections and request basic passport data (see para 5 above) as detailed below:-

Dr. G. Clamot - Belgium, France, Switzerland
Dr. M. Gullord - Nordic countries
Dr. G. Ladizynsky - Israel
Dr. A. Popovic - Yugoslavia
Dr. H. Thomas - Czechoslovakia, Ireland, U.K.
Dr. K. Temiz - Greece, Romania 1/, Turkey

In the case of participating countries not listed above the ECP/GR Secretariat will request Country Coordinators to undertake this task in their respective countries and to transmit the data to the data base as designated in para 9 below.

7. It was recommended that when the number of accessions is more than 200, the data should be transferred in the form of magnetic tape, using the procedures and specification which will be recommended by the ECP/GR Workshop on Exchange of Information to be held in Radzikow, Poland, 25-27 October 1984. Other computerized formats will be acceptable when the use of magnetic tapes by the sender is not possible. Special arrangements can be made for transmission of data through the ECP/GR Secretariat for computer formats which are not suitable for the data base.

It was recommended that collections with less than 200 accessions should send their data in manual form.

8. After a review of the hardware available to the major collections, the Working Group was of the opinion that none of the institutions involved had any constraints to the transmission of their data in computerized form. It was recommended that the oat workers of W.P.B.S. request the active support of their colleagues in the Genetic Resources Unit who have experience of genetic resources data processing, and are responsible for the European Lolium and Trifolium repens data bases. It was recommended that the Institute for Small Grains, Kragujevac and other collections in Yugoslavia, request the active collaboration of the Maize Research Institute in Zemun, which is in possession of a microcomputer NGR IRS 8 and that in Belgium an agreement be sought with an adequately equipped institution e.g. the international Phaseolus data base located in the University of Gembloux.

9. The meeting identified three institutes which might act as a European oat data base having regard to their computer facilities and also to their active interest in Avena. They are: the Institut für Pflanzenbau und Pflanzenzüchtung der Bundesforschungsanstalt für Landwirtschaft (F.A.L.) Braunschweig, F.R.G; the Plant Breeding and Acclimatization Institute, Radzikow, Poland and the Research Institute of Plant Production, Ruzyně, Czechoslovakia. It was agreed that final arrangements for the European data base be left in the hands of the ECP/GR Secretariat. The Institut für Pflanzenbau und Pflanzensuchung der Bundesforschungsanstalt für Landwirtschaft was approached by the Secretariat and has agreed to act as an European oat data base.

10. The registration of basic passport data, the identification of duplications and the publication of a preliminary European catalogue are requested by the Working Group as the first steps in the establishment of an oat data base and it was recommended that full passport data and all available data on characterization and evaluation be registered in a second stage.

1/ Not a member country of ECP/GR

11. The Working Group recommended that a very close collaboration be established between the European data base and the PGRC Canada.

12. Avena descriptors: The Working Group considered the importance of producing a standard list of descriptors to facilitate the registration of full characterization and evaluation data in the central data base. Accordingly a provisional list of 36 descriptors was produced - 20 characterization descriptors and 16 evaluation descriptors. The Working Group recommended that this list, with appropriate descriptors to be inserted in the Secretariat, should be circulated to all oat workers for comments and suggestions through Country Coordinators or members of the Working Group who have assumed responsibilities as intermediaries, as defined in para 6. Subsequently comments should be sent to Dr. Ladizinsky and Dr. Gullord for scrutiny in relation to wild species and cultivars respectively. It is envisaged that this will be followed by rapid publication of a final descriptor list for Avena in standard IBPGR format. For the estimated timetable of this work see para 13 below.

It was further recommended that when circulating the draft descriptor list breeders be asked to advise on the relative usefulness of the various evaluation descriptors to their work.

13. The Working Group recommended that the following timetable be observed:

Registration of data

- Completion of this report and its distribution, and the nomination of a central data base, by ECP/GR Secretariat - October 1984.
- Return of basic passport data to data base - February 1985.
- Collation of information, identification of duplicates and production of a draft preliminary European catalogue - July 1985.
- Checking of the draft catalogue by curators and return of comments - October 1985.
- Production of the preliminary European oat catalogue - January 1986.
- Workshop for rationalization of collections, promotion of characterization and evaluation - February 1986.
- Registration of full data in data base.^{1/}

Descriptor List

- Completion of draft descriptor list and distribution to members of Working Group and to Country Coordinators for circulation to all oat specialists for comment by October 1984.
- Return of comment to Working Group members or Country Coordinators for onward transmission to ECP/GR Secretariat by January 1985.
- Collation of comments and submission to Dr. Ladizinsky (wild species specialist) and Dr. Gullord (cultivar specialist) for their final revision by February 1985.
- Return of final draft descriptor list to Secretariat by March 1985.
- Publication of Oat descriptor list - July 1985.

14. Wild and weedy forms

14.1 Nomenclature. It was agreed by the Working Group that, since the focus of its work is on the genetic attributes of accessions and their utilization in breeding, it

^{1/} The Working Group felt it was not in a position to assign a realistic target date for this stage.

should adopt and use a biological concept of a species and define it as "that group of forms which readily exchange genes," although it was recognized that flexibility of approach is necessary and that departures from this simple principle may be expedient from time to time. The Working Group saw little merit in adopting one of the more elaborate taxonomic systems, based principally on morphological characters, and which may, on occasions, obscure genetic affinities.

14.2 Distribution ranges and patterns

Dr. Ladizinsky presented a series of up-to-date maps which he had prepared, showing the distribution of 10 wild taxa (Appendix V). Data on the distributions of A.barbata, A.sterilis and A.fatua were not considered because of their enormous distribution ranges across the Mediterranean basin, Europe, temperate Asia and the USA. These forms could be considered menacing rather than menaced. A synopsis of Dr. Ladizinsky's views on the other species is presented below:

14.2.1 A.ventricosa Diploid. Its distribution is characterized by very large gaps in its known distribution range but it is very common in the fairly arid habitats to which it is adapted. It appears to be of little practical value since it is very difficult to hybridize it with the cultivated oats (2x and 6x). There is no evidence of serious erosion and therefore no case can be made at present for special action to collect and conserve seed material in genebanks.

14.2.2 A.clauda and A.eriantha (Syn. A.pilosa). These two diploids are separated by a single allelic difference governing the type of the dispersal unit (the floret in A.clauda; the spikelet in A.eriantha). Both forms are often sympatric, have wider ecological tolerances than A.ventricosa and are widely distributed from the western Mediterranean to the Caspian Sea. Hybrids between them and cultivated A.strigosa and A.sativa are difficult to obtain and in any event they are thought to be of little practical value. No threat to erosion exists; there are large collections in Canada and therefore no case can be made for special collecting at the present time.

14.2.3 A.hirtula; A.wiestii group. A taxonomically complex group of fully fertile diploid forms. Two main ecological types may be recognized: 1) the tall growing A.hirtula in abundant populations along the Mediterranean coastline and particularly in Spain. It is very close morphologically to A.barbata and often occurs in mixed populations with it, and 2) the small desert type A.wiestii. Both are fully cross compatible with A.strigosa and have been crossed with A.sativa with difficulty. They are thought to be of some potential value to breeders (crown rust resistance) and they have been used to some extent. However, much material has been collected; there is no threat to erosion, they may be readily collected from the wild and it is clear that no special collecting and conservation is necessary.

14.2.4 A.longiglumis. Has strict ecological requirements, being adapted to sandy coastal soils or to desert sand dunes as tall coastal or short desert races respectively. The former are often associated with A.hirtula and the latter with A.wiestii. Widely distributed from western to eastern Mediterranean, frequently in large populations. No discernable erosion and therefore no special collecting is necessary. Gene transfer from this species to cultivated diploids and hexaploids is extremely difficult.

14.2.5 Avena prostrata. A new diploid species restricted to a few locations in southern Spain where it is very common. Partially fertile hybrids have been obtained with A.hirtula. The few accessions available indicate that this species is the best source of resistance to mildew in the genus, amounting to immunity. There is a clear need for collecting and for field studies to determine the range of variation and distribution of this species.

14.2.6 Avena damascena Diploid. Exists as a single collection only from a site near Damascus, Syria. Forms partially fertile hybrids with A.hirtula. Further collecting is clearly necessary to determine the distribution range, range of variation and breeding value of this new form.

14.2.7 A.maroccana (syn. A.magna). Tetraploid found on heavy soils at several locations in Morocco. F₁ hybrids with A.sativa are sterile but may be successfully backcrossed as females to A.sativa. Its attributes include seed protein contents up to 30%, resistance to stem and crown rusts. Additional collections should be made to increase the range of genetic variation available, the knowledge of its distribution range and to assess whether there is potential or actual erosion.

14.2.8 A.murphyi. Tetraploid. Collected from a single site only in southern Spain where it shows much variation in panicle and spikelet characters. Gene transfer to A.sativa is possible by backcrossing sterile F₁'s. Its attributes include seed protein contents of 25-27%, crown rust and mildew resistances. Visits to the site in three different years reveal great variation in plant numbers from year to year. More exploration is needed in Spain and Morocco to determine the ranges of distribution and variation. This population is known to be under threat from developments in arable cropping in its habitat, and collecting is urgent. It is likely to be found elsewhere on heavy or stony soils.

14.2.9 A.canariensis. Diploid. Distribution apparently restricted to two islands in the Canaries where it is common on one of them, and to a few sites in Southern Morocco. It has a remarkably short growing season. Gene transfer to the A.hirtula:wiestii group seems possible. More collections are needed from Morocco with studies of its distribution range, its range of variation and of dangers of erosion.

14.2.10 Avena macrostachya (syn. Avenastrum macrostachya). Tetraploid outbreeder: which was transferred by Baum from Avenastrum to Avena because of some affinities with the annual species. The known distribution is restricted to one area at high elevation in the Algerian Atlas. It is cross compatible with Avena sativa but F₁'s are highly sterile. Gene transfer may be possible by backcrossing to the A.sativa male. A.macrostachya is notable for extreme winter hardiness and its possible resistance to barley yellow dwarf virus. Clearly there is a need to collect and study variation, distribution range and security of wild populations.

14.2.11 General points. Many of the species listed above appear to have strict or narrow ecological requirements and information on the type of habitat in which they may be expected is clearly essential for successful collecting.

It is remarkable that five new good species have been found in the past 15 years or so in the genus of one of our major crop plants, and that despite this the full array of ancestral species still has not yet been found.

15. Identification key to the genus Avena

Dr. Ladinzinsky presented and introduced a simple key for the identification of the species and species groups (Appendix VI), based principally on the relative lengths of the glumes, the morphology of the lemma tip and of the callus. He drew attention to a number of inconsistencies which do not, however, detract from its practical value.

The key is simple and the Working Group recommended it as a valuable practical field guide to species identification in a difficult group. It was accepted with expressions of appreciation.

16. Collecting expeditions

16.1 Landraces and old cultivars. The Working Group was unable to identify any urgent rescue collecting of cultivated forms and it recommended that further collecting should await the production of the European Avena inventory so that it may be planned in relation to the demonstrable gaps in collections.

16.2 Wild species

The wild species for which there is a clear and urgent need for collecting are: A.prostrata, A.maroccana, A.murphyi, A.canariensis, A.damascena and A.macrostachya. Of these, the first four have known locations in Spain and Morocco. The Working Group recommended that an expedition consisting of an experienced leader, a trainee collector and a counterpart provided by the country concerned should be in the field for the month

of May 1985 and should visit appropriate areas in Spain, Morocco and the Canary Islands, to collect from known populations, to look for new ones and to define as far as possible the ecological preferences of these species.

Dr. Ladizinsky accepted the position of leader and the responsibility of training his assistant. Two possible candidates for the position of trainee were identified.

The Working Group recommended that the Welsh Plant Breeding Station (W.P.B.S.) and the Plant Breeding Institute, Svalöf, Sweden, be approached by the Secretariat with the request that they undertake the work of full and definitive identification of accessions, of characterization and of studying the range of variation in each species.

The Working Group further recommended that ECP/GR should investigate the practicalities of arranging for the collection of A.damascana with the assistance of ICARDA in 1986. It thought that the 1985 trainee might provide the necessary expertise in species identification.

It also recommended that the 1985 trainee be asked to be the leader of a collecting trip to the Algerian Atlas for A.macrostachya in 1986 and asked that IBPGR should assist in preparing the way. It was agreed that again a trainee should participate in collecting trips to Syria and Algeria.

17. Promotion of characterization/evaluation

The Working Group, recognizing that in many countries the oat crop is in decline and consequently funding for oat work is difficult to obtain, recommended:

- (a) that since governments have committed themselves to inputs-in-kind by virtue of their signature to the Project Document or alternatively the Letter of Agreement, Country Coordinators should be asked to stimulate the full characterization of the material in their collections.
- (b) additionally, the Secretariat should explore the possibility of obtaining funding for characterization and particularly for evaluation work, from appropriate international or commercial organizations.

It was recognized that detailed plans for collaborative work on characterization and evaluation should be made after the production of a rationalized European list of Avena accessions. In this way, unnecessary duplication of effort may be avoided.

18. Training

The Working Group, recognizing the important contribution which training can make to the execution of its plans, considered training needs in relation to the collecting, the registration of data, and to characterization. Problems of evaluation were thought to be too distant for sensible discussion at this stage. It was not aware of any constraints to the central data base and therefore was not able to make any recommendations on this point. It was assumed that the Secretariat would make appropriate action if the need became apparent. The question of training for collecting was discussed when planning collecting expeditions and recommendations are to be found in para 16 above.

In relation to characterization the Working Group recognized that it is likely that training of individuals may be necessary but were unable to identify particular individuals in need. It recommended therefore that the Secretariat should attempt to identify training needs through Country Coordinators. However, it did suggest that the Nordic Gene Bank, as a recognized centre of expertise, be asked to undertake training in characterization on behalf of the programme. Additionally it was suggested that ARARI should host a group training course providing that expert instructors from abroad could be found to conduct the course, ARARI would undertake to provide accommodation and suitable material growing in field plots.

19. Phytosanitary matters

The Working Group was unable to identify any particular or severe constraints to the free exchange of germplasm arising from the operation of official quarantine procedures. It recognized the necessity for such procedures and recommended that collaborating workers should be meticulous in their observance of regulations.

The Working Group expressed its appreciation of the excellent facilities and hospitality provided by Dr. Temiz and his staff and for the smooth organization of the meeting.

APPENDIX I

LIST OF PARTICIPANTS

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APPENDIX II

AGENDA

1. Welcome by Dr. K. Temiz, Director of the Aegean Regional Agricultural Research Institute
2. Statement of objectives of the meeting
3. Election of a Chairman, and adoption of agenda
4. Formulation of a work plan for the ECP/GR on oat genetic resources for the period of Phase II, 1984-1986 and for Phase III, 1986-1989, under the following topics:
 - 4.1 Assessment of the contents of European collections
 - 4.1.1 Listing of accessions of wild species, landraces and old cultivars (Working paper): extent of duplication
 - 4.1.2 Extent and availability of passport and characterization data
 - 4.1.3 Storage of the material
 - 4.2 Implementation of a data base
 - 4.2.1 Production of an oat inventory based on minimum passport data
 - 4.2.2 Identification of duplicates
 - 4.2.3 Establishment of full data base (registration of passport, characterization and evaluation data)
 - 4.2.4 Allocation of responsibilities for the data base
 - 4.3 Review of present knowledge of speciation in Avena and need for wider diversity in collections
 - 4.3.1 Speciation in Avena
 - 4.3.2 Review of knowledge of distribution of wild species (maps)
 - 4.3.3 Any urgent field "rescue" operations identified by Working Group members with proposals on how and when the operations will be carried out
 - 4.4 Consideration of an oat descriptor list
 - 4.5 Promotion of the collection and registration of complete characterization data
 - 4.6 Identification of training needs and recommendations on implementation
 - 4.7 Phytosanitary matters
 - 4.8 Other business
5. Writing of report and recording decisions and recommendations made under item 3; 4.1 to 4.8 above
6. Consideration of report and approval by Working Group

MAJOR EUROPEAN OAT COLLECTIONS

INSTITUTE	Cultivated varieties Landraces	Origin	Documentation			Wild species and Origin	Documentation		
			Passport	Charac- terization	Eval.		Passport	Charac- terization	Eval.
GEMELOUX	700-800	Europe	Partial	-	-	-	-	-	-
SADOVO BGR	540	-	All	All	-	-	-	-	-
BRAUNSCHWEIG DEU	35 Landraces 755 Cultivars	33 Germany 1 Sweden 1 Unknown	All	-	-	95 All <u>A. sterilis</u> (Japan, U.S.A.)	All	-	-
GATERSLEBEN DDR	780 Landraces 1220 Cultivars	Most oat growing countries. All oat growing countries.	All	All	Crude Protein for 1400	<u>A. barbata</u> 11 (southern Europe) <u>A. fatua</u> 50 (Europe+ Ethiopia 2 + USA 1) <u>A. longiglumis</u> 2 (Morocco 1 + Israel 1) <u>A. sterilis</u> 1 (Italy)	All	-	-
TAPIOSZELE HUN	1065 accessions (22 species)								
TEL AVIV ISR						Mainly <u>A. sterilis</u> group (Israel)	All		Some for disease resistance
GBN NLD	533 mostly old varieties	320 Europe 145 N.America 25 Asia 16 Africa 13 S.America 4 Australia	Only name and country of origin	Length of straw only	Mildew; some for protein content	10 <u>A. brevis</u> 2 <u>A. ludoviciana</u> 2, <u>A. diffusa</u> 1, <u>A. strigosa</u> 1, <u>A. orientalis</u> , <u>A. sativa</u> 2 unknown			
NEB NORDIC COUNTRIES	59 varieties 35 lines	Finland Sweden Norway	All	Most	Most				
RADZIKOW POL	1200+ accessions mostly varieties	Europe USA	All			<u>A. abyssinica</u> 2 <u>A. wiestii</u> 1 <u>A. strigosa</u> 6 <u>A. fatua</u> 7 <u>A. ludoviciana</u> 7 <u>A. sterilis</u> 55 <u>A. barbata</u> 2	All		
INIA ESP	180 Landraces 45 Cultivars		All	165					
ARARI TUR	185	Turkey	All	-	-	<u>Avena</u> sp., <u>A. barbata</u> 381 <u>A. sterilis</u> , <u>A. ludoviciana</u> <u>A. pilosa</u> , <u>A. clauda</u> , <u>A. fatua</u> (Turkey)	All	-	-

W.P.B.S. GBR	750		ALL	variable	Mildew	<u>A. longiglumis</u> 10+ (N.Africa, Eastern C.) <u>A. hirtula</u> 10+ (" " " ") <u>A. clauda</u> 5 (" " Turkey, Iran) <u>A. pilosa</u> 2 (" " " ") <u>A. ventricosa</u> 1 (Algeria) <u>A. prostrata</u> 1 (Spain) <u>A. canariensis</u> 1 (Canary Islands) <u>A. maroccana</u> 1 (Morocco) <u>A. murphyi</u> 1 (Spain) <u>A. barbata</u> 10+ (North Africa, Middle East) <u>A. vaviloviana</u> 5+ <u>A. abyssinica</u> 10+ (Ethiopia) <u>A. danascena</u> 1 (Syria), <u>A. macrostachya</u> (Morocco) <u>A. sterilis</u> large number, (most countries where sp. found) <u>A. fatua</u> " " (" " " ") <u>A. hybrida</u> 2 (Afghanistan), <u>A. occidentalis</u> 2 <u>A. strigosa</u> 10	Most	Partial	Mildew some of CRE and BYDV resistance
KRAGUJEVAC YUG	164	Worldwide	150	-	-				

APPENDIX IV

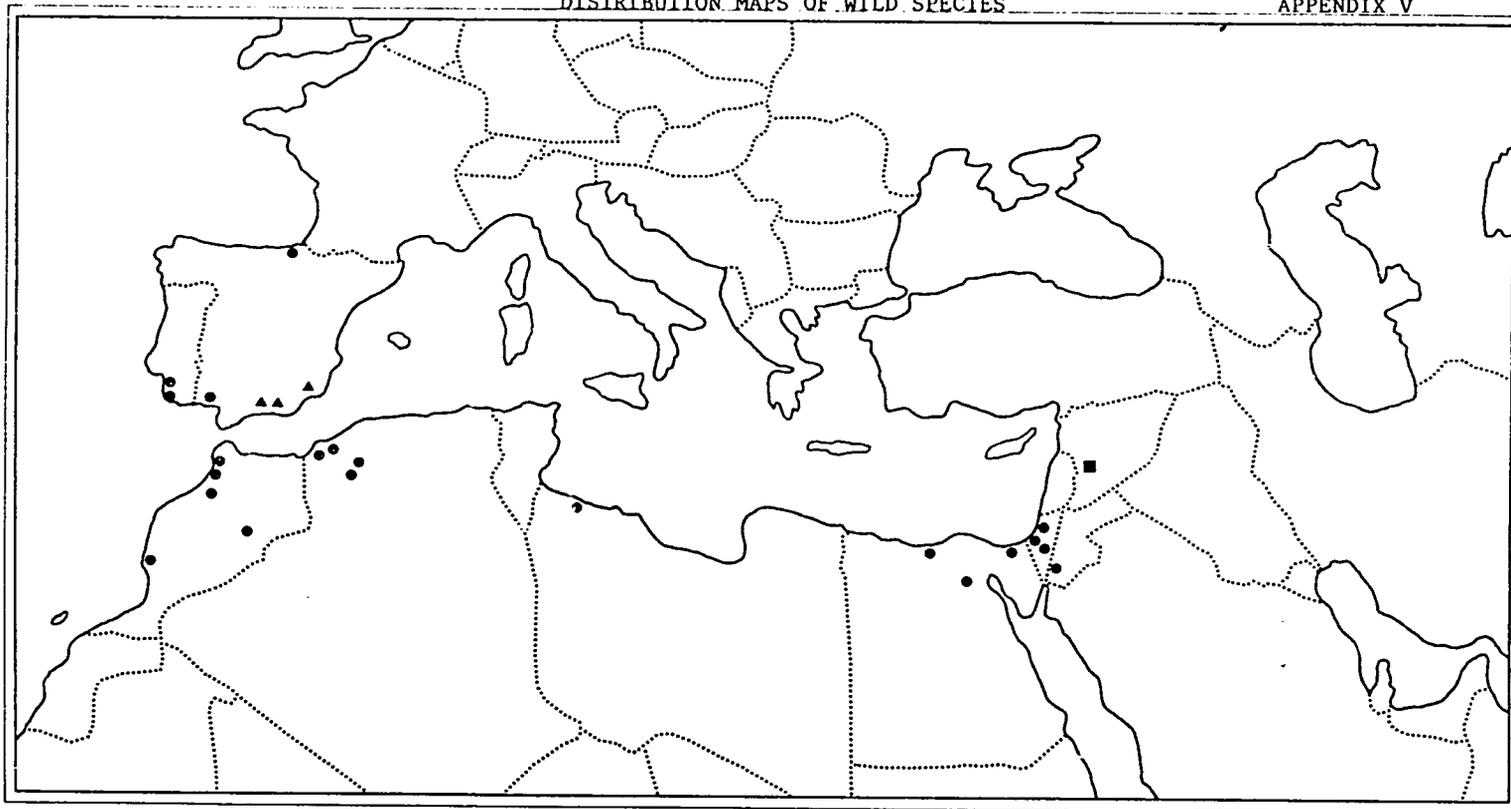
EUROPEAN AVENA DATA BASE

LIST OF BASIC PASSPORT DESCRIPTORS

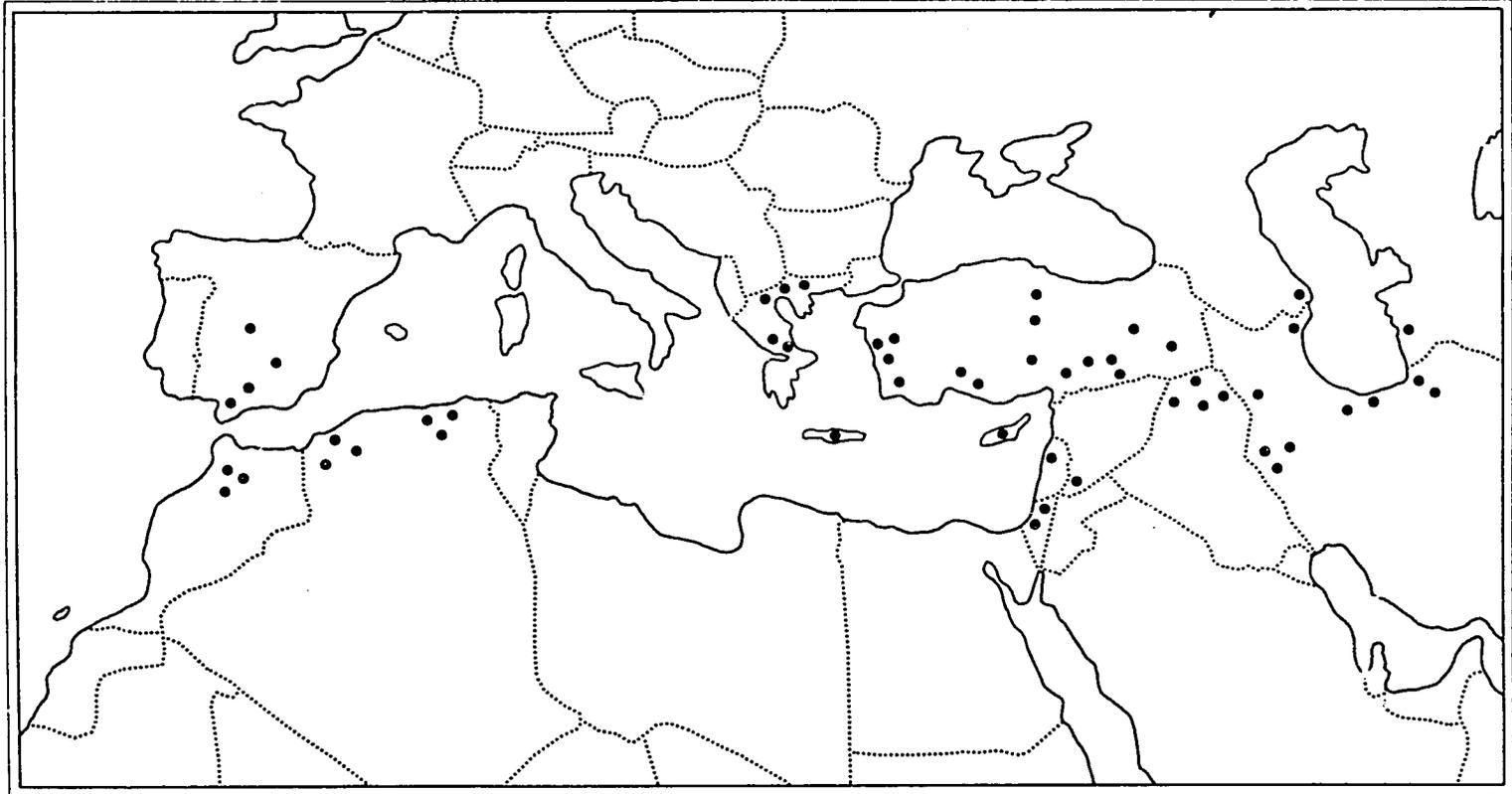
- 1) ACCESSION NUMBER
- 2) SCIENTIFIC NAME*
- 3) NAME OF DONOR/DONATING INSTITUTION
- 4) DONOR NUMBER
- 5) ANY OTHER NAMES OR NUMBERS: UNDER THIS HEADING GIVE ALSO NAME OF THE VARIETY/OLD CULTIVAR, WHEN APPROPRIATE.
- 6) NAME OF COLLECTOR/COLLECTING INSTITUTE
- 7) COLLECTOR'S NUMBER
- 8) COUNTRY OF ORIGIN
- 9) DATE OF COLLECTION
- 10) SAMPLE STATUS
 - a) pure line
 - b) population

* It is recommended that the simple classification provided in Appendix VI (identification Key) should be used. If another taxonomic key is used please provide full details.

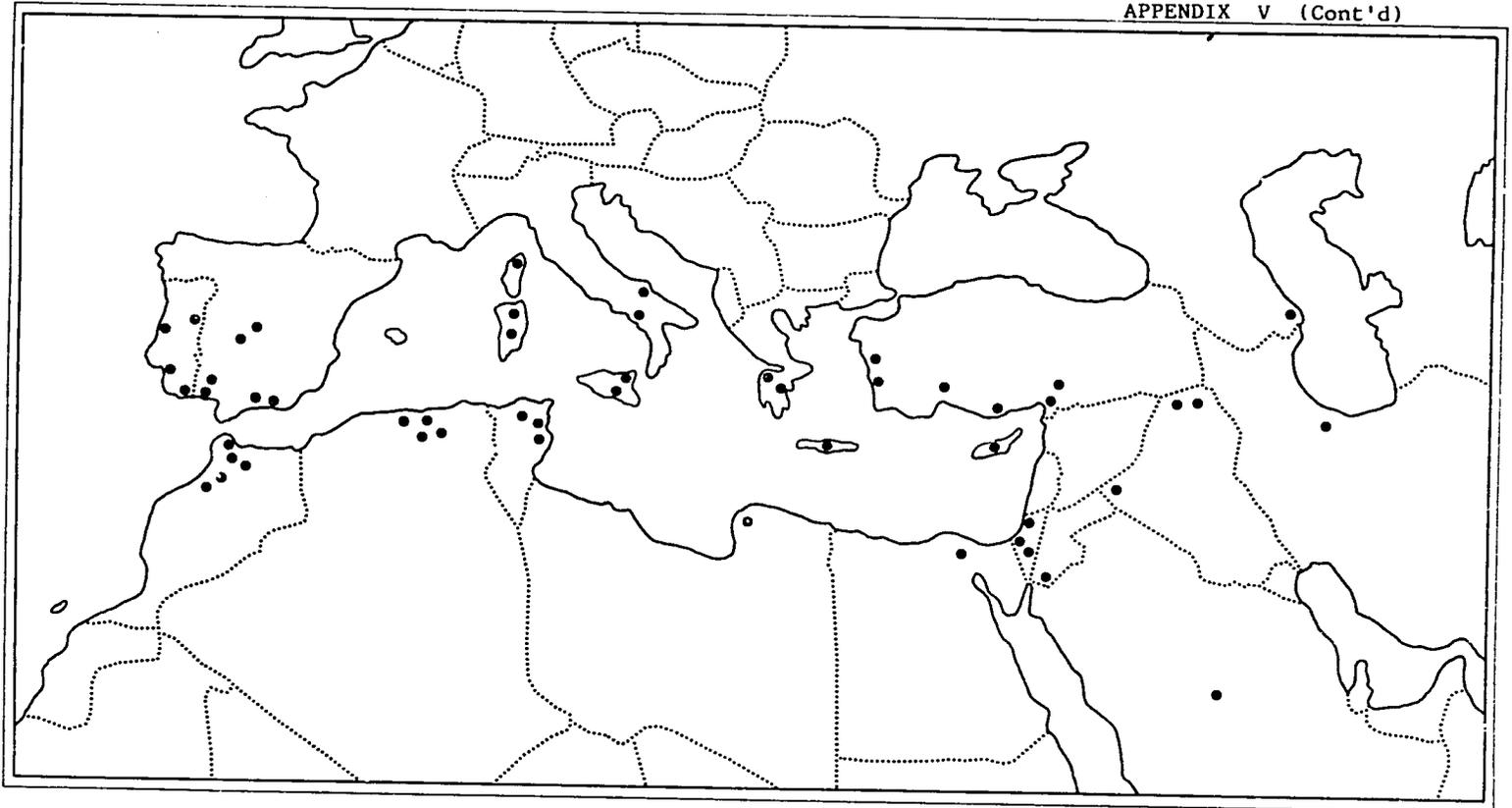
IF INFORMATION NOT AVAILABLE LEAVE BLANK



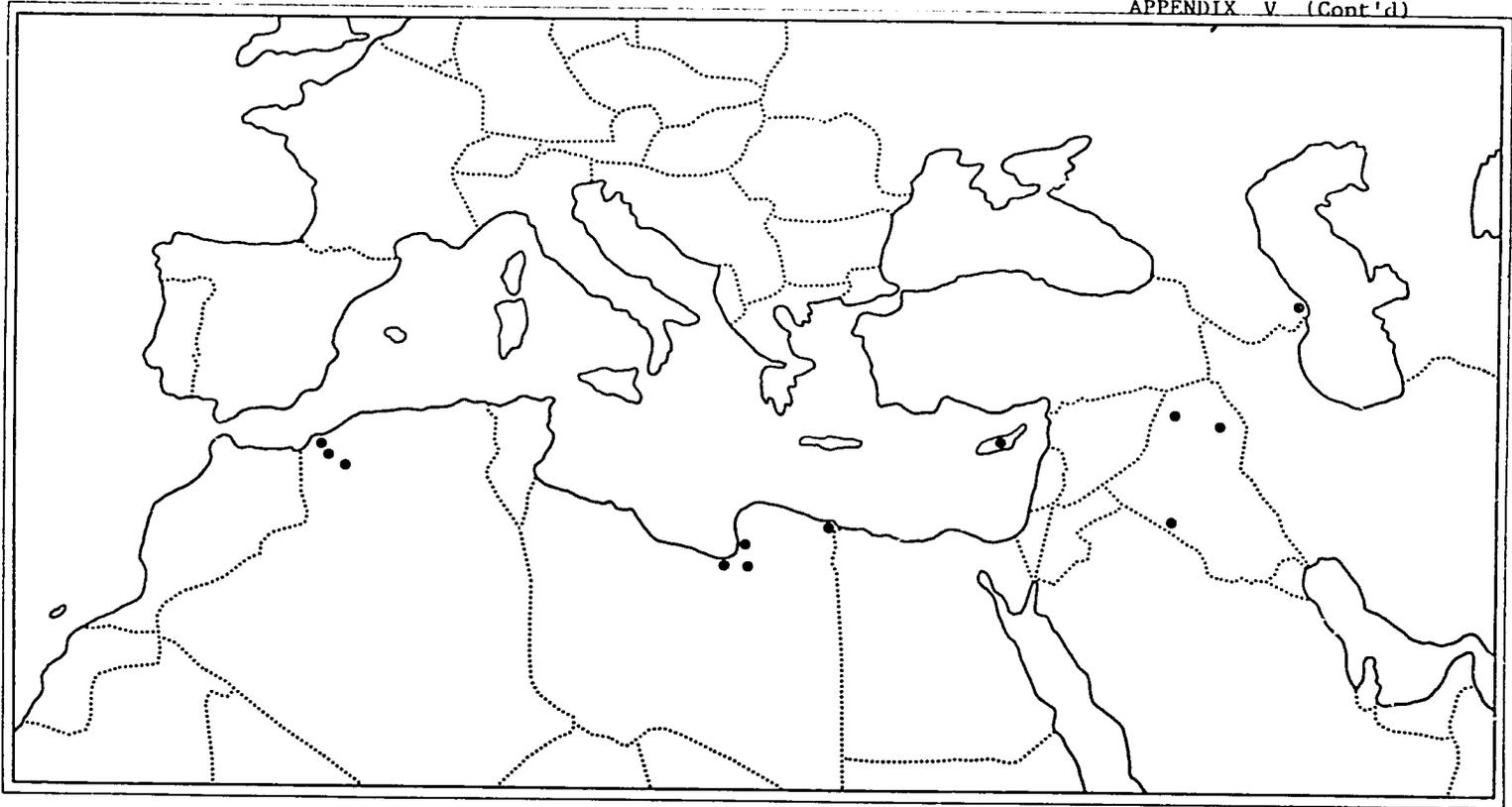
Geographical distribution of Avena longiglumis ● A. prostrata ▲ and A. damascena ■



Geographical distribution of *Avena clauda* - *A. eriantha* ●



Geographical distribution of *Avena hirtula* - *A. wiestii* group●



Geographical distribution of *Avena ventricosa* ●



Geographical distribution of Avena maroccana ● A. murphyi ▲ and A. canariensis ■

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

AVENA WORKING GROUP

KEY TO THE GENUS AVENA

The purpose of the key is to provide a simple method for identifying the biological species of the genus Avena. We stress in this classification the genetic affinities and crossability relations since they are of prime importance for the breeders when carrying the cultivated and the wild gene pools of oats. On the other hand the attempt has been made to retain in the key, where possible, terms that are used by plant breeders for morphological species. This perhaps has brought some inconsistency to the key but it might promote communication between breeders and taxonomists.

The key is based mainly on highly stable morphological characteristics. However, in several cases final identification has to be made by verifying chromosome number. This is occasionally inevitable for separating the diploid sibling species A. hirtula, A. prostrata and A. damascena from the tetraploid A. barbata.

EUROPEAN COOPERATIVE PROGRAMME FOR GENETIC RESOURCES

Identification key to the genus Avena

1. glumes unequal, the lower glume is $1/4 - 1/2$ the length of the upper.
 - glumes equal or nearly so (2)
 - 1a. lowest glume is $1/4$ the length of the upper, the dispersal unit is the spikelet (glumes excluded), callus at the base of the diaspore long (4-5mm) and sharp. A. ventricosa.
 - 1b. lowest glume is $1/3 - 1/2$ the length of the upper A. clauda
 - I. the dispersal unit is the floret Subsp. clauda
 - II. the dispersal unit is the spikelet (glumes excluded) Subsp. eriantha
2. lemma tips biaristulate
 - lemma tips bidentate to bisubulate (3)
 - 2a. mature spikelets remain intact, cultivated
 - mature spikelets disarticulate, the floret is the dispersal unit (2b)
 - I. panicle condensed, $2n=14$, mainly in W. Europe. A. strigosa
 - II. panicle sparse, $2n=28$, mainly in Ethiopia A. abyssinica
 - 2b. the callus at the base of the dispersal unit subulate (2-3mm long), glumes 25-40mm, panicle usually flagged A. longiglumis.
 - 2c. callus short and blunt
 - I. culms prostrate or nearly so, leaves glabrous, glumes 12-15mm, lemma bristles 2-4mm, $2n=14$. A. prostrata.
 - II. culms erect, leaves pubescent, glumes 20-25mm, lemma bristles 3-5mm, $2n=14$. A. damascena.
 - III. leaves glabrous or hairy, glumes 15-30mm, lemma bristles 5-11mm, $2n=14$. A. hirtula - A. wiestii group
 - IV. lemma bristles 2-5mm, $2n=28$. A. barbata.
3. lemma tips bidentate
 - 3a. mature spikelets remain intact, cultivated. $2n=42$. A. sativa.
 - 3b. mature spikelet disarticulate, the dispersal unit is the floret. $2n=42$. A. fatua
 - 3c. the dispersal unit is the spikelet (glumes excluded).

- I. awn inserted at the lower 1/4 of the lemma, $2n=42$. A. murphyi.
- II. awn inserted at the middle of the lemma, spikelet small (12-15mm) with two florets, $2n=14$. A. canariensis.
- III. spikelet big (25-30mm), 3-4 florets, extremely hairy, wider at the point of the awn insertion than at the tip of the lemmas, $2n=28$. A. maroccana.
- IV. awn inserted at the lower 1/3 - 1/2 of the lemma, spikelet V-shaped, $2n=42$. A. sterilis.