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

Forages Working Group

REPORT
of a Working Group held at the
Fodder Crops and Pastures Institute
Larissa, Greece, 7-9 February 1984

UNDP - IBPGR
Rome, May 1984

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, which was established by the CGIAR in 1974, is composed of its Chairman and 16 members; 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 coordinatean 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

Following the agreement for Phase II of the European Cooperative Programme for the Conservation and Exchange of Crop Genetic Resources (ECP/GR) to be organized on the basis of crop working groups, priorities were identified by the Scientific Advisory Committee of Phase I and endorsed by the Governing Board meeting in Brussels in October 1982. A high priority was accorded to forage grasses and legumes. Accordingly, a Working Group was convened, at the invitation of the Fodder Crops and Pastures Research Institute, Larissa, Greece, 7-9 February 1984. A list of the participants is shown in Appendix I.

The participants were warmly welcomed by Dr. E.L. Stylopoulos, Director of the host Institute. Dr. J.H.W. Holden, Senior Adviser of the IBPGR was unanimously elected Chairman of the Working Group.

Dr. Holden indicated the need to formulate a detailed work plan for Phase II of the Forages Genetic Resources Programme (1983-86) and also continuing to Phase III (1986-89). The work plan should be the basis of the cooperative work among the member countries and would be recommended to governments by the IBPGR - the operating agency - with request for the implementation by appropriate genebanks or institutes within their countries. The Terms of Reference of the Working Group as defined by the Third Annual Meeting of the Governing Board (December 1982) are set out in Appendix II.

REPORT

A brief summary of the conclusions reached and the Working Group's recommendations to achieve the aims of the programme are set out in following sections.

1. Descriptor lists for grasses and forage legumes

The Working Group considered the draft descriptor lists which had been produced by the subcommittees on grasses and legumes of the EEC Committee on Disease Resistance and better use of Gene Banks and by the IBPGR. These descriptor lists resulted from lengthy discussions by the experts on the two subcommittees and the Chairman proposed that the Working Group should, if possible, adopt them as the basis for their work, on the understanding that they were subject to amendment if this became necessary in the light of practical experience.

In addition, the Secretariat presented a joint grass/legume descriptor list in which all passport data had been amalgamated and the characterization and evaluation sections were presented separately.

The Working Group discussed the merits of the combined and separate presentations and it was recommended that the matter be left to IBPGR/EEC who would finance the publication of the descriptor lists.

Various criticisms and suggestions were made regarding passport descriptors. These comments were designed to improve the accuracy and value of the recorded data and were noted by the Secretariat for inclusion wherever possible in the published lists.

A lengthy discussion took place on the characterization and evaluation sections of the legume descriptor list. The relevance and utility of certain descriptors was questioned and agreement was reached on a minimum number of amendments to the EEC/IBPGR draft.

2. Forages directory

The Directory of Germplasm Resources - Forages (Grasses, Legumes,) prepared by Mr. Ellis Davies, IBPGR Forages Officer, was presented to the meeting and considered and recommended for publication after necessary updating. In addition, an abstract of the

entries relating to European Collections was given as a working paper (Appendix III). This was considered in detail and updated where necessary. The view was expressed that, in a number of cases where a very large number of accessions were recorded, the figure probably included breeders' lines and that while the summary gave an impression of the scale of European forage holdings, the true picture would only emerge following registration of individual lines in the data bases.

3. Definition of minimum passport data for preliminary identification of duplicates in different collections

After a critical discussion it was agreed by the Working Group that only eight passport descriptors were necessary in the first instance, for the identification of replicates due principally to exchanged accessions between genebanks. The Working Group recognized that the problem of replication of identical material in different collections was probably not as serious in forage grasses and legumes as in some other crops, but that, nevertheless, a step-by-step approach to the registration and processing of data should be adopted. As a second step it is envisaged that registration of full passport data should follow for selected accessions, and in this way the registration and processing of unnecessary data will be avoided.

4. Transfer of data from collections to a central data base

The problem of easy and rapid transfer of data from collections to the species/genus data base was examined and the Working Group made the following recommendations:

4.1 A minimum passport data sheet (Appendix IV) be circulated from ECP/GR Secretariat through Country Contacts to all institutions having forage collections.

4.2 That for collections of less than 200 accessions the data should be transcribed manually on to these forms and sent direct to the nominated species data base as directed on the form.

4.3 For collections of more than 200 accessions, data should be sent:

4.3.1 on diskettes between institutes with fully compatible hardware;

4.3.2 on magnetic tape (9 track, 1600 b.p.i. and IBM format) between institutes with incompatible hardware. An explanatory note will be attached to the minimum passport data sheet giving necessary instructions for correct reading by data bases; and

4.3.3 for institutes with equipment which is incompatible with that in the species data base, and which lack facilities for transferring data to magnetic tape, that (i) where the data is recorded on Apple II equipment it should be sent on diskettes to IBPGR for transfer to magnetic tape and (ii) where it is registered in other types of equipment, the ECP/GR Secretariat should be notified. They will make other arrangements for conversion on to tape.

4.4 Cases of data transfer which are not covered by the arrangements outlined above should be referred to the Secretariat for advice and assistance.

4.5 It was further recommended that data bases should be active in stimulating genebanks to provide the necessary data so that the momentum of the programme can be maintained.

4.6 A survey of computer facilities available in countries and institutes was compiled from the knowledge of members of the Working Group and is given in Appendix V. The purpose of this survey was to enable the Working Group and collaborating institutes to predict the occurrence of incompatible interactions between equipment in institutes holding collections and the data base in the transfer of data in computerized form.

5. Central data bases for species or genera

Having regard to the known interests of institutes or genebanks for particular species or genera and to the computer facilities available at these institutes, the Working Group recommends that the Secretariat requests the following organizations to assume responsibility for the registration and processing of the preliminary passport data of the species or genera as listed below:

5.1 Forage Legumes:

Medicago sativa, M. falcata, M. media, Institut National de Recherche Agronomique (INRA), France; alternative, Institute of Plant Introduction and Genetic Resources, "K. Malkov" Sadovo, Bulgaria.
Medicago annual species, Instituto Nacional de Investigaciones Agrarias, (INIA), Badajoz, Spain.

Trifolium pratense, Federal Research Station of Changins, Switzerland; alternative, Nordic Gene Bank (NGB), Lund, Sweden.

Trifolium repens, Welsh Plant Breeding Station, (WPBS), Aberystwyth, Wales, UK.

Trifolium subterraneum, INIA, Badajoz, Spain.

Vicia sativa and other Vicia spp., INIA, Zaragoza, Spain; alternative, Aegean Regional Agricultural Research Institute,(ARARI), Izmir, Turkey.

5.2 Grasses:

Lolium perenne, L. multiflorum, WPBS, Aberystwyth, Wales, UK.

Lolium annual species, Laboratorio del Germoplasma, Consiglio Nazionale delle Ricerche, (CNR), Bari, Italy.

Dactylis spp., Plant Breeding and Acclimatization Institute, (IHAR), Radzikow, Poland.

Festuca spp., IHAR, Radzikow, Poland.

Bromus spp., Research Centre for Agrobotany, Institute for Plant Production and Qualification, (RCA) Tapioszele, Hungary.

Poa spp., Gene Bank Federal Research Centre of Agriculture,(FAL), Braunschweig, Federal Republic of Germany

Phleum spp., Nordic Gene Bank (NGB), Lund, Sweden.

Phalaris tuberosa, Laboratorio del Germoplasma, CNR, Bari, Italy, alternatively, INIA, Badajoz, Spain.

The ECP/GR Secretariat should endeavour to obtain agreement to these proposals by June 1984.

The Working Group hopes that the institutes listed above will continue to assume responsibilities for the designated species in the subsequent registration of complete passport data.

6. Identification of duplicates

The Working Group expects that after the registration of preliminary passport data, which should be completed by January 1985, obvious duplicates will be identified by the data bases. The next stage will be the registration of full passport data using descriptors from the IBPGR/EEC lists for all accessions except those obvious duplications which have resulted from seed exchange between genebanks.

7. Transfer of full passport data to data bases

It was clear to the Working Group that a standard format (developed from that used for the minimum descriptors) should be used to facilitate the transfer of the full passport and characterization data as available, for the second phase of the European forages inventory.

The Working Group was strongly of the opinion that at the end of 1984, or early 1985, a workshop/meeting be organized by the Secretariat for collaborators responsible for central data bases and invited specialist advisers, to review progress of data registration in the first phase and to plan procedures for the transfer of full passport data in the second phase.

8. Acquisition and registration of characterization data

Members of the Working Group discussed the problems of characterization in the forage grasses and legumes, which are formidable compared to those in inbreeding species. These difficulties arise from the scarcity of qualitative characters of stable expression and from the high genotype X environment interactions which affect the expression of quantitative characters. The Working Group accepted with reluctance the view that characterization data for forage grasses and legumes was in general to be regarded as of limited value, although of value for other purposes e.g. preliminary evaluation.

9. Urgent collecting requirements

The group gathered views of participants on a crop basis, on the need for urgent collecting of germplasm which is suffering genetic erosion:

9.1 Legumes

9.1.1 Red clover. Because of the reduction in red clover cultivation, local varieties (landraces) were in danger of becoming extinct in the following countries: Belgium, Germany, France, Italy, Netherlands, UK and probably Spain. It was already too late to effect a rescue in Switzerland. Urgent steps are necessary to locate, collect and store these landraces. In the main, the countries concerned could be expected to organize this work from their own resources using various agencies, e.g. seed certification authorities.

The Nordic countries had already taken steps to store 47 landraces and similar work was proceeding in Hungary. Poland and Greece reported that ecotypes of wild red clover were disappearing and that genetic resources were still available within the country but assistance is needed to collect and store the seed. Wild clover ecotypes would be collected from the southern Swedish marshes in the next five years.

9.1.2 Lucerne. Local varieties of lucerne were disappearing in Belgium, Germany and Italy and rescue was urgent. Such landraces were probably endangered in Spain while France had taken steps to conserve five out of six named landraces. Similar rescue operations were in progress in Hungary. Wild Falcata was endangered in Bulgaria and Greece. Thre is also a need to collect lucerne in Morocco, Tunisia, Algeria and Libya.

9.1.3 White clover. Only Greece and Italy indicated a danger of genetic erosion as a result of heavy grazing or the spread of the cultivated area. But collecting would be part of their future work programmes.

9.1.4 Annual medics and subterranean clover. In general it can be said that these species are in danger of genetic erosion as a result of heavy grazing pressure and the spread of cultivation. ICARDA, whose mandate spreads across North Africa, and from Turkey to Pakistan, has collections as does Spain (Badajoz).

South and Western Australia have massive collections from the Mediterranean countries. Other collecting was done by e.g. ICARDA in Morocco in 1983 but holdings need to be checked to see what gaps remain.

9.1.5 Trifolilum resupinatum and T. alexandrinum. These two species are of some economic importance and the status of their genetic resources needs to be investigated, particularly in Egypt.

9.2 Grasses

9.2.1 Perennial ryegrass. Action was needed to preserve germplasm of this species in the UK (flood meadows, water meadows and old permanent pasture); in Greece (lowland grazing); in Federal Republic of Germany (for marginal areas) and similarly for Austria, Switzerland and northern Italy. Fifty ecotypes along a north-south transect have already been collected in Italy for studies on adaptive survival and ecotypes are also being collected in Hungary.

9.2.2 Lolium multiflorum. Obsolete varieties should be preserved in the Netherlands and the UK. In Belgium most ecotypes have probably disappeared and action is necessary to preserve possible survivers. Collecting is also necessary in the Po Valley.

9.2.3 Annual Lolium. Information was requested by the UK on the danger of erosion in L. rigidum, L. subulatum and L. gaudini. The Working Group did not consider that these species were endangered. There is a collection of annual Lolium ex-Pakistan in the Netherlands.

9.2.4 Festuca. A large collection of F. pratensis exists in Poland (700 accessions) and of F. arundinacea in Bari. Switzerland had collections of both along a transect from Grenoble - Innsbruck. Information was requested by the UK in the distribution of F. arundinacea subsp. nechtritziana var. aristata and var. mediterranea and F. arundinacea subsp. fenas. Variation in five isozyme systems had been detected in F. rubra in Sweden. Small collections of 56 and 70 chromosome F. arundinacea from Morocco were available at WPBS, Aberystwyth, Wales.

9.2.5 Dactylis. This was an important species in Greece, Hungary, Italy, Poland and Spain and sizeable collections existed or were being built up. Collecting is required in Israel.

9.2.7 Bromus. B. inermis was an endangered species especially in Hungary and greater attention would be paid to collection in the future.

9.2.8 Poa. No apparent danger of genetic erosion.

9.2.9 Arid/semi-arid land species. Phalaris tuberosa, Cenchrus ciliaris, Cynodon dactylon, Oryzopisis spp. and Hyperrhenia. There is much interest in Southern Italy, Spain, Israel. Collecting is required and should be accomplished within current and future national programmes.

10. Review of existing network of characterization/preliminary evaluation

Under this heading it was reported that WPBS, Aberystwyth and Fodder Crops and Pastures Institute, Larissa, were considering the feasibility of a cooperative evaluation project to study the extent of location X genotype interactions. It was suggested that Spain and Italy might be interested in participating in this project.

The Working Group recommended that the attention should be directed towards the parameters which define the interactions. It was agreed that the future development of the above project should be left in the hands of WPBS and the ECP/GR Secretariat.

It was pointed out that such network evaluation/assessments were currently being carried out in Europe by various agencies, e.g. FAO Mediterranean Network, FAO Lowland Grassland Network, Eucarpia project for timothy and red clover and EEC white clover seed production project.

11. Phytosanitary matters.

The Working Group recognized that the operation of phytosanitary controls frequently constituted a barrier to rapid exchange of material between genebanks. While questioning the relevance of these restrictions to the exchange of small samples for genetic resources work, the Working Group nevertheless recognized the need for strict observance of regulations and expressed the wish that the responsible authorities would ensure that these were as few and as simple as possible.

12. Training

The Working Group identified the following needs for individual and group training (Table 1):

Table 1. Training Needs identified by Working Group

Institute	Number of Persons		
	Collecting techniques	Regeneration and Seed Multiplication	Computer Data processing and Documentation
(1) Welsh Plant Breeding Station Aberystwyth, UK			1
(2) Plant Breeding Institute, Perugia, Italy	1	1	
(3) Federal Station for Agricultural Research, of Changins, Switzerland		1	1
(4) Institut National de la Recherche Agronomique, France		1	1
(5) Fodder Crops and Pasture Research Institute, Larissa, Greece	1	1	
(6) Res.Centre for Agrobotany, Inst.Plant Prod.and Qualification, Tapioszele, Hungary	1-2	1	
(7) Plant Breeding and Acclimatization Institute, Radzikow, Poland	1	1	
(8) Institute K. Malkov, Sadovo, Bulgaria	1	1	
(9) Instituto Nacional de Investigaciones Agrarias, Badajoz, Spain	1-2	1-2 (grasses)	2
(10) Technical University,Munchen Weihensteplhan, Federal Republic of Germany	1		1
TOTALS	7 to 8	8 to 9	6

The Secretariat was requested to determine the training needs in other countries.

Offers of training courses and facilities were received from the Welsh Plant Breeding Station for collecting procedures, characterization, evaluation and seed multiplication techniques; from Instituto Nacional de Investigaciones Agrarias, Badajoz, for collecting and seed multiplication techniques for annual legumes; and from the Nordic Gene Bank, Lund, preferably on an individual basis, and Plant Breeding and Acclimatization Institute, Radzikow, for data registration and processing by computer.

The Secretariat was requested to determine training possibilities in other countries in the areas of seed multiplication, collecting procedures and computer documentation.

As reported previously the Working Group **strongly recommended** that a meeting/workshop be held in late 1984 or early 1985 for all personnel responsible for the species/genus data bases, together with computer specialist consultants.

When discussing training needs it was proposed to the Working Group that meeting/seminars would be of value to the programme on (i) germplasm resources of halophytes as forage crops and (ii) gel electrophoresis techniques as a tool in the exploration of genetic shift in forage populations during multiplication and of genetic variation in natural populations.

13. In situ conservation

The Nordic Gene Bank is conducting modelling studies on the operation of *in situ* reserves in the Nordic countries. Similar conservation work is known to be in progress in other countries and other agencies are also involved.

The Working Group **recommends** that the Secretariat should establish a close liaison between ECP/GR and general developments in this area. Finally the Working Group hopes that member countries will be active in establishing nature reserves for *in situ* conservation of forage species.

APPENDIX I

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APPENDIX II

TERMS OF REFERENCE FOR ECP/GR WORKING GROUPS

1. To organize joint activities between sub-regional groupings and countries;

2. to collect information on germplasm material available in European genebanks of the crop(s) concerned, and study this information with the aim of identifying redundant duplicates and gaps in the collections;

3. to organize or stimulate collecting trips to fill the gaps in existing collections;

4. to agree on measures to conserve the crop germplasm material in long-term and/or medium-term storage;

5. to arrange for the regeneration of material so that minimal change takes place in its genetic composition;

6. to organize or stimulate characterization and preliminary agronomic evaluation of accessions, using accepted descriptors;

7. to see that acquired data are stored in an acceptable way in computers, using agreed descriptors and data management systems;

8. to arrange for the compilation of catalogues for the crop(s) concerned;

9. to encourage free exchange of germplasm between genebanks and between genebanks and plant breeders;

10. to propose and/or organize individual or group training activities; and

11. to encourage close links between those dealing with plant genetic resources and plant breeders.

FORAGE SAMPLES HELD IN EUROPEAN COLLECTIONS

APPENDIX III

Institute & country	Medicago			Trifolium				Vicia spp.	Other Genera	Lolium			Dactilis	Festuca			Bromus spp.	Poa		Phleum	Agrostis	Geographical Representation
	sat	falc	oth. spp.	prat.	rep.	subt	oth spp			per.	mult.	oth spp		pra	ar.	rub		prat.	oth spp			
Université de Liège BEL															X	spp						
Rijksstation Voor Plantenveredeling BEL				3	2					9	4		1	2				2		1		BEL
'K. Malkov' BGR	* 1223	30	77	384	107		29			107	77		410		93 spp			80		45		EUR AUSTRALIA USSR
	* 30 samples in long term storage								405 Onobrychis spp 63 Melilotus spp 58 Lotus spp													
Piestany CSK				450																		22 countries
Research and Breeding Institute for Fodder Plants Troubsko CSK	220			139	146		234					224 wild ecotypes of grasses										21 countries
Research and Breeding Institute for Fodder Plants Roznov CSK										109	53	39	61	44	29 +20 spp	29		71	10		24	Worldwide
Research and Plant Breeding for Technical Crop & Legumes Temonice CSK								220 sat. 54 villosa 15 pannonica														
Lusignan INRA FRA	7* 1/																					5 FRA
Amelioration Fourrageres G. I. E Provins FRA	1140			425	212				45 Lotus													2 TUN Worldwide
Station experimentale du Magneraud INRA FRA	37			30	24			17 sat		54	29	5	16	7 10 ovina	4	37		19	2	29	11	FRA EEC countries
Institut de Recherche Vilmorin FRA											X spp				X spp							

* Samples in long-term storage. 1/ mostly breeder's line.

FORAGE SAMPLES HELD IN EUROPEAN COLLECTIONS

Institute & country	Medicago			Trifolium				Vicia spp.	Other Genera	Lolium			Dactilis	Festuca			Bromus spp.	Poa		Phleum	Agrostis	Geographical Representation
	sat	falc	oth. spp.	prat.	rep.	subt	oth spp			per.	mult.	oth spp		pra	ar. div	rub		prat.	oth spp			
Bayerische Landesanstalt für Bodenkultur und Pflanzenbau, Freizing DEU		X	spp	X			X										Graminae					
Braunschweig DEU	108			92	24	54	9	43		250	110	19	328	110 3 ovina	14	20	8	29	59	176	5	worldwide
Technische Universitat München Freising	25								40 Lotus uliginosus	100		30	100					60	20	120	20	DEU EUR
Plant Breeding Station Hohenheim University DEU										50										150		
Zentral Institut für Genetik Gatersleben DDR								366 spp					738	fodder grasses								
Larrisa GRC	135	2	36	106	32	11	60	664 sativa	9 Melilotus 56 Lathyrus sativus 91 Lathyrus spp 13 Lotus spp		44		76	32 spp.			2			9		
Tapiosszele HUN	466spp			1040spp				831spp		112spp			157	281 spp.			86			46	23	HUN 40% EUR Worldwide
University of Agricultural Sciences Keszthely HUN								17 acc. of forages					188 grasses									
Agricultural Research Institute ISL																X		X		3	X	ISL
Hebrew University ISR Jerusalem								1900 wild Leguminosue														ISL

FORAGE SAMPLES HELD IN EUROPEAN COLLECTIONS

Institute & country	Medicago			Trifolium				Vicia spp.	Other Genera	Lolium			Dac-tilis	Festuca			Bromus spp.	Poa		Phleum	Agro-tis	Geographical Representation
	sat	falc	oth. spp.	prat.	rep.	subt	oth spp			per.	mult.	oth spp		pra	ar.	rub		prat.	oth spp			
Universita degli Studi Perugie			54		51		76	3	42 Lotus corniculatus 33 Onobrychis	1			8		1							Central ITA
Germplasm Institute Bari ITA		447 spp			114 spp			2300spp	8 Lotus 8 Onobrychis		197 spp		180		118 spp		7			13		Mediterranean ITA
Instituto Sperimentale per le cultura Foraggera, Lodi ITA	X			X	X	X		X	Lotus corniculatus	X	X									X		
Institute of Agronomy and Field Crops, Univ. of Padova ITA													26									
Instituto de Genetica e Sperimentazione Agraria "Nazareno" Strampelli" ITA	4												5		3					2		
Foundation for Agricultural Plant Breeding NLD													X Grasses									
Plant Breeding and Acclimatization Institute POL	60			60	40			350	80 Ornithopus sativus	620			1400	800	160	150	90	310		590	90	Worldwide
Botanical Garden Bydgoszoz POL												7000 Graminae, mostly ecotypes										
Academy of Agriculture Dept. of Plant Breeding, Lublin POL								400 Lathyrus														
I.N.I.A.E.R. Elvas PRT	159	175		54	39	178	355	58sat 105spp	37 Lathrus spp 38 Ornithopus 21 Lotus spp.	121	107 spp		127		56							Mediterranean

FORAGE SAMPLES HELD IN EUROPEAN COLLECTIONS

Institute & country	Medicago			Trifolium				Vicia spp.	Other Genera	Lolium			Dac-tilis	Festuca			Bromus spp.	Poa		Phleum	Agro-tis	Geographical Representation
	sat	falc	oth. spp.	prat.	rep.	subt	oth spp			per.	mult.	oth spp		pra	ar.	rub		prat.	oth spp			
Institut "Dr. Petru Groza" Cluy - Napoca ROM				224	180		130		73 Ononrychis spp 59 Melilotus 100 Fabaceae									250spp				ROM Worldwide
Grassland Research Inst. Brasov ROM				100	150					350			400	200	250	350	150	200				ROM Worldwide
Research Institute for Cereals and Technical Crops Fundulea ROM	420										180		220		110							ROM Worldwide
INIA, Badajoz ESP						3000																Mediterranean
INIA, Madrid ESP	400 spp							238 wild spp. incl. Medicago and Trifolium													Mediterranean	ESP
La Coruna ESP				13						3			30									ESP
Estaçion Experimental del montanara Zaragoza ESP								560 sat.	25 Onobrychis sativa				57									ESP
Nordic Gene Bank				170			30			33			34	29		133	133			147	87	Nordic countries
Federal Agricultural Research Station Changins CHE									20 Onobrychis sativa				200	218 spp								
ARARI Izmir TUR	370 spp.				875			710spp	74 Lathyrus spp 68 Melilolus spp 68 Onobrychis spp 62 Lotus spp		196 spp		200	70				21				TUR
W.P.B.S. Aberystwyth GBR	183			163	136		16		12 Ono-brychis 52 Lotus spp Lotus 140 Other spp	799	230	49	933	353	240		800					EUR + temperate areas
Royal Botanic Gardens Kew GBR	5		91	14	26		288	79	40 Lotus 24 Melilotus 17 Onobrychis			20	28	40 spp			68					EUR

APPENDIX IV

MINIMUM PASSPORT DATA SHEET

COLLECTOR
- INITIALS: _____
- NUMBER: _____
- UNKNOWN []

DONOR
- NAME: _____
- ID. NUMBER: _____
- UNKNOWN []

ACCESSION NUMBER
- INST. ID. _____
- NUMBER: _____

SEED
- AVAILABLE []
- NOT AVAILABLE []

OTHER NUMBER
- : _____
- : _____

MEDICAGO []
- SAT. AND MEDIA []
- FALC []
- OTHER []: _____

TRIFOLIUM []
- PRAT. []
- REP. []
- SUBT []
- OTHER [] : _____

VICIA (EXCLUDING FABA) [] : _____

PEDIGREE : _____

CULTIVAR NAME : _____
- LOCAL []
- MODERN []

BREEDER'S LINE NO : _____

BREEDING INST. : _____

LOLIUM []
- PER. []
- MULT []
- OTHER [] : _____

DACTYLIS []
- GLOMER []
- OTHER [] : _____

FESTUCA []
- PRAT. []
- AR. []
- RUBRA []
- OTHER [] : _____

BROMUS [] : _____

POA []
- PRAT []
- OTHER [] : _____

PHLEUM [] : _____

PHALARIS [] : _____

APPENDIX V

AVAILABLE DATA PROCESSING EQUIPMENT

COUNTRY	MICRO	'MAIN FRAME'	MAGNETIC TAPE	NUMBER OF TRACKS	DENSITY BPI	IBM FORMAT POSSIBLE
1. Inst. of Plant Intro. and Gen Resources "K Malkov"	APPLE II	-	+	?	?	?
2. Welsh Plant Breeding Station Aberystwyth, UK	APPLE II	DIGITAL VAX	+	?	?	?
3. Nat. Res. Inst. for Agriculture France	?	?	?	?	?	?
4. Inst. of Crop Sci. and Plant Breeding-Fed.Res.Center Agric. Braunschweig-Vlkenrode FRG	?	Siemens 7750	+	9	800/1600	+
5. Cereal Inst. Thessoloniki GRE	APPLE II	-	-	-	-	-
6. Res.Centre for Agrobotany, Inst Plant Prod. and Qualilfication Tàloszele HUN	APPLE II	HONEYWELL	+	?	?	-
7. ICARDA Aleppo	?	DDP11/34A VAX 111780	?	?	?	?
8. Faculty of Agriculture-The Hebrew Unliv. of Jerusalem ISR	PC IBM	CYBER AND IBM	+	9	287	+
9. Plant Breeding Inst. University of Perugia ITA	?	PRIME 550	+	9	1600	+
10. Foundation for Agric. Plant	?	?	?	?	?	?
11. NGB-Iceland, Denmark, Norway, Sweden, Finland	NGB-IKS-83	SEVERAL POSSIBLE	+	7/9	800/1600/6200	+
12. Plant Breeding and Acclimatization Inst. RAdzikow PLD	-	DIGITAL 11/34	+	9	800	+
13. Station Federale de Recherches Agron. de Changins, Nyon, CHG	-	DATA GENERAL	+	9	800	+
14. Nat. Res. Institute for Agriculture, Badojoz, ESP	HEWLETT PACKARD 150	CYBER 172	+	9	800/1600	+

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