European Cooperative Programme for Crop Genetic Resources Networks

ECP//GR

Report of a Working Group on Solanaceae

IPGRI

***Ad hoc* Meeting, held jointly with the Fifth Meeting of the EGGNET Project**
17 September 2004, Bari, Italy

M.C. Daunay, W. van Dooijeweert, L. Maggioni and E. Lipman, *compilers*

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The International Plant Genetic Resources Institute (IPGRI) is an independent international scientific organization that seeks to improve the well-being of present and future generations of people by enhancing conservation and the deployment of agricultural biodiversity on farms and in forests. It is one of 15 Future Harvest Centres supported by the Consultative Group on International Agricultural Research (CGIAR), an association of public and private members who support efforts to mobilize cutting-edge science to reduce hunger and poverty, improve human nutrition and health, and protect the environment. IPGRI has its headquarters in Maccarese, near Rome, Italy, with offices in more than 20 other countries worldwide. The Institute operates through four programmes: Diversity for Livelihoods, Understanding and Managing Biodiversity, Global Partnerships, and Improving Livelihoods in Commodity-based Systems.

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The European Cooperative Programme for Crop Genetic Resources Networks (ECP/GR) is a collaborative programme among most European countries aimed at facilitating the long-term conservation and the increased utilization of plant genetic resources in Europe. The Programme, which is entirely financed by the member countries and is coordinated by IPGRI, is overseen by a Steering Committee composed of National Coordinators nominated by the participating countries and a number of relevant international bodies. The Programme operates through nine networks in which activities are carried out through a number of permanent working groups or through *ad hoc* actions. The ECP/GR networks deal with either groups of crops (cereals; forages; fruit; oil and protein crops; sugar, starch and fibre crops; vegetables, medicinal and aromatic plants) or general themes related to plant genetic resources (documentation and information; *in situ* and on-farm conservation; inter-regional cooperation). Members of the working groups and other scientists from participating countries carry out an agreed workplan with their own resources as inputs in kind to the Programme.

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PART I. SUMMARY OF THE MEETING

Note: this report was written one-and-a-half years after the meeting. Therefore, the information it contains has been updated where relevant.

Introduction

The ECP/GR informal group on Solanaceae held its first meeting on 21 September 2001 in Nijmegen, the Netherlands, back-to-back with the second annual meeting of the EU-funded EGGNET project on eggplants. This group was officially accepted as a Solanaceae Working Group (WG) by the ECP/GR Steering Committee in October 2001. A second *ad hoc* meeting, with fewer participants, was held in May 2003 in Skierniewice, Poland, during the Vegetables Network meeting. A third *ad hoc* meeting – the first meeting of the official ECP/GR Working Group on Solanaceae – was held on 17 September 2004, just after the final EGGNET meeting (15-16 September 2004), in Bari, Italy, at the Institute of Plant Genetics of the National Research Council (IGV-CNR, Istituto di Genetica Vegetale-Consiglio Nazionale delle Ricerche). G. Polignano of IGV opened the day by welcoming all participants and his colleague D. Pignone gave an introduction to the institute and the genebank.

L. Maggioni, ECP/GR Coordinator, then thanked the organizers, the ECP/GR and EGGNET participants attending this meeting and gave an overview of the historical and international context of the meeting. He pointed out that for Phase VII of ECP/GR (2004-2008) the Vegetables Network expanded by merging with the Medicinal and Aromatic Plants Working Group, giving rise to the Vegetables, Medicinal and Aromatic Plants (VEGMAP) Network, now consisting of seven Working Groups. Four of them were prioritized, and three, including the Solanaceae WG were given lower priority, i.e. a smaller budget. All information concerning the VEGMAP and the Solanaceae WG can be found on the ECP/GR Web site. Information was also given about (1) EURISCO, the European database of all crops, collecting information from national catalogues (over 900 000 accessions, and still increasing); (2) the feasibility study for "a European Genebank Integrated System (AEGIS)"; (3) the involvement of seed companies in regenerating genebank material; and (4) the ratification in 2004 of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). Finally, L. Maggioni presented the expected new call for proposals for GENRES projects (which was eventually launched in September 2005).

After these introductions, the agenda was presented and adjustments were made. Before running the agenda, each participant gave a short self-introduction.

Establishment of Central Databases

Introductory remarks

Databases are essential in the centralization of information related to plant genetic resources. The Eggplant Database was developed in the framework of the 2000-2005 EGGNET project and became the ECP/GR Eggplant Database after 2005. For the other solanaceous crops, the ECP/GR Group decided at the first *ad hoc* Solanaceae meeting in 2001 to establish one database per crop, and members volunteered to maintain and host them. The distribution of responsibilities is listed in Table 1 below:

Table 1. ECP/GR Solanaceae databases

Crop	Database manager	Hosting institute
1. *Physalis*	Jaime Prohens	COMAV, Valencia, Spain
2. *Cyphomandra*	Jaime Prohens	COMAV, Valencia, Spain
3. *Capsicum*	Lerzan Gül Aykas	AARI, Izmir, Turkey
4. Tomato	Andrew Omelchenko	VIR, St. Petersburg, Russian Federation
5. Eggplant	Gerard van der Weerden	Botanical Gardens of the Radboud University, Nijmegen, The Netherlands

The progress reports were presented by the database managers.

Physalis *and* Cyphomandra *databases: achievements*

Jaime Prohens

Background information on *Cyphomandra* and *Physalis*

The genus *Cyphomandra* is native to South America and encompasses a group of about 30 species of shrubs and small trees bearing juicy, round, oval or elliptical berries (Bohs 1994)[1]. Multiple molecular data sets indicate that *Cyphomandra* is deeply nested with *Solanum* and because of this Bohs (1995)[2] transferred them to *Solanum* and provided new combinations for many of the *Cyphomandra* species. However sound the phylogenetic interpretation, the taxonomic treatment of this taxon within the genus *Solanum* is debatable, and both options are open. Most breeders still use the *Cyphomandra* names and most records in genebanks refer to *Cyphomandra* and because of this we have used the term *Cyphomandra* to name the database.

Genus *Physalis* contains around 95 species of annual and perennial herbs, and although most of them are native to the New World (mainly Mexico and adjacent areas), there are also some representatives from the Old World (Hunziker 1979).[3] One of the most distinctive features of *Physalis* is that the berries are enclosed in the persistent inflated calyx. The species boundaries in *Physalis* are poorly defined (Sullivan 1984)[4], which makes the identification of materials difficult, in particular for the wild species.

An important fact in the conservation and regeneration of genetic resources of both genera is that although the cultivated species are mainly self-compatible (*P. ixocarpa* appears to be an exception) and seem to be mostly autogamous, bumble bees and other pollinators commonly visit the flowers, and therefore some cross-pollination probably takes place. However, many wild species are self-incompatible, and therefore are allogamous (Pringle and Murray 1991[5]; Richman and Kohn 1999[6]).

---

1 Bohs, L. 1994. *Cyphomandra* (Solanaceae). Flora Neotropica. Monograph 63. New York Botanical Garden, New York, USA.

2 Bohs, L. 1995. Transfer of *Cyphomandra* (Solanaceae) and its species to *Solanum*. Taxon 44:583-587.

3 Hunziker, A.T. 1979. South American Solanaceae: a synoptic survey. Pp. 49-85 *in* The Biology and Taxonomy of the Solanaceae (J.G. Hawkes, R.N. Lester and A.D. Skelding, eds). Linnean Society of London, London, UK.

4 Sullivan, J.R. 1984. Pollination biology of *Physalis viscosa* var. *cinerascens* (Solanaceae). American Journal of Botany 71:815-820.

5 Pringle, G.J. and B.G. Murray. 1991. Reproductive biology of the tamarillo, *Cyphomandra betacea* (Cav.) Sendt. and some wild relatives. New Zealand Journal of Horticultural Science 19:263-273.

6 Richman, A.D. and J.R. Kohn. 1999. Self-incompatibility alleles from *Physalis*: implications for historical inference from balanced genetic polymorphisms. Proceedings of the National Academy of Sciences of the United States of America 96:168-172.

Economic importance

The only cultivated species of *Cyphomandra* is the tree tomato (*C. betacea* (Cav.) Sendt.), although other species are occasionally harvested from the wild (Bohs 1989)[7]. In the case of *Physalis*, several species are grown for their edible fruits: *P. peruviana* L. (cape gooseberry), *P. pruinosa* L. (strawberry tomato), or *P. ixocarpa* Brot. (husk tomato); while another species, *P. alkekengi* (winter cherry or Chinese lantern) is grown as an ornamental (Menzel 1951)[8].

The tree tomato is commercially grown in South America and also in New Zealand. While in South America most of the production is devoted to the local markets, in New Zealand an important part of the production is exported (Prohens and Nuez 2000)[9]. *Physalis peruviana* and *P. pruinosa* are mainly grown in South America and *P. ixocarpa* in Central America.

Tree tomatoes and fruits of *Physalis* have an increasing presence in exotic fruit markets and because of this they may be interesting for the diversification of horticultural production in Europe (Prohens *et al.* 2003)[10]. Nonetheless, the economic importance of *Cyphomandra* and *Physalis* in Europe is much lower than that of other solanaceous crops. In consequence, the number of accessions conserved in germplasm collections is substantially smaller and the information is more fragmented than is the case for major crops. In fact many accessions are conserved in botanical gardens and in researchers' collections (mainly of botanists and breeders) rather than in germplasm banks.

The *Cyphomandra* and *Physalis* databases

Within the scope of the European Cooperative Programme for Crop Genetic Resources Networks (ECP/GR) it was decided to create two central databases with passport information for *Cyphomandra* and *Physalis*. This task was assigned to the Centro de Conservación y Mejora de la Agrodiversidad Valenciana (COMAV, Valencia, Spain).

Requests for information on the number of accessions and passport data for *Cyphomandra* and *Physalis* were sent to three different types of sources: a) personal contacts (i.e. researchers working with these genera); b) people interested in "other crops" (i.e. other than eggplant, pepper and tomato) from the ECP/GR Solanaceae Working Group; and c) European institutes reported as holding accessions of *Cyphomandra* (3 institutes) or *Physalis* (14 institutes) in the FAO's World Information and Early Warning System (WIEWS) on Plant Genetic Resources for Food and Agriculture (PGRFA) database.

In total, we obtained passport information from four institutes for *Cyphomandra* (totalling 83 accessions) and from nine institutes for *Physalis* (totalling 284 accessions) (Table 2). Within the genus *Cyphomandra*, there are accessions belonging to five different species (Table 3), although most of the accessions are of the cultivated *C. betacea*. Eight accessions are classified as *Cyphomandra* sp. For *Physalis*, there are representatives of 25 species, and similarly to *Cyphomandra,* most of them belong to the cultivated species. It is remarkable that the husk tomato in some cases is classified as *P. ixocarpa* Brot. and in other cases as *P. philadelphica* Lam. Also, 44 accessions are classified as *Physalis* sp. (Table 3).

---

7 Bohs, L. 1989. Ethnobotany of the genus *Cyphomandra* (Solanaceae). Economic Botany 43:143-163.

8 Menzel, M.Y. 1951. The cytotaxonomy and genetics of *Physalis*. Proceedings of the American Philosophical Society 95:132-183.

9 Prohens, J. and F. Nuez. 2000. The tamarillo (*Cyphomandra betacea*): a review of a promising small fruit crop. Small Fruits Review 1(2):43-68.

10 Prohens, J., A. Rodríguez-Burruezo and F. Nuez. 2003. New crops: an alternative for the diversification of horticulture. Food, Agriculture and Environment 1:75-79.

Table 2. Contributing institutes and number of accessions included in the *Cyphomandra* and *Physalis* databases

Database	Institute name (country)	INSTCODE*	No. of accessions
Cyphomandra	IPK (Germany)	DEU538	7
	COMAV (Spain)	ESP026	58
	INRA Montfavet (France)	FRA030	1
	Nijmegen Botanical Garden (The Netherlands)	NLD020	17
Total			**83**
Physalis	Postdam University Botanical Garden (Germany)	DEU362	5
	IPK (Germany)	DEU538	41
	COMAV (Spain)	ESP026	61
	INRA Montfavet (France)	FRA030	7
	ENITHP Angers (France)	FRA250	26
	Nijmegen Botanical Garden (The Netherlands)	NLD020	135
	Plant Breeding Institute Skierniewice (Poland)	POL030	6
	Suceava Genebank (Romania)	ROM007	1
	Fruit Growing Research Institute Arges (Romania)	ROM009	2
Total			**284**

* INSTCODE = FAO institute code

Table 3. Taxonomic composition of the records included in the databases (number of accessions)

Cyphomandra					
C. abutiloides	1	*C. amotapensis*	1	*C. betacea*	70
C. corymbifolia	2	*C. endopogon*	1	*C.* sp.	8

Physalis					
P. acutifolia	1	*P. aequata*	2	*P. alkekengi*	24
P. angulata	8	*P. coztomatl*	4	*P. crassifolia*	2
P. curassavica	4	*P. edulis*	1	*P. floridana*	5
P. francheti	1	*P. fuscomaculata*	1	*P. heterophylla*	1
P. ixocarpa	25	*P. lagascae*	1	*P. lanceifolia*	1
P. longifolia	1	*P. mexicana*	2	*P. minima*	3
P. peruviana	95	*P. philadelphica*	25	*P. pruinosa*	16
P. pubescens	7	*P. subglabrata*	1	*P. virginiana*	1
P. viscose	4	*P.* sp.	44		

In order to develop the database, all the passport information was included in a Microsoft Access file following the format of the FAO/IPGRI *Multi-crop Passport Descriptors* (MCPDs) and used to create two searchable databases, one for *Cyphomandra* (http://www.comav.upv.es/Cyphomandra.html) and another one for *Physalis* (http://www.comav.upv.es/Physalis.html). Searches can be made on any of the descriptors. For most of the descriptors, a displayable menu allows one to choose any of the states of the descriptor. The results of searches consist of the basic details of the accessions matching the request (institute code, accession number, genus, species, common crop name and country of origin). Complete passport information available for each accession can then be obtained by clicking on each of the accessions. Information can be obtained from the same page for the meaning of the coded states of the descriptors (e.g. for biological status of accession, or collecting/acquisition source). Users can also download the complete database from the Web page.

Next steps

The next steps for developing the databases will be to obtain information from the institutes which have not yet provided it and also to identify other institutes which may hold accessions of these genera. Identification of duplicates between different institutes by using

the passport data could also be useful for including this information in the database. Also, minimum descriptors for the primary characterization of both genera do not exist and are necessary for the optimal use of characterization data. Once these descriptors are developed, it will be possible to carry out new characterizations using these descriptors and to enter the information in a characterization database, which can be put on-line together with the passport database.

Pepper database: achievements

Lerzan Gül Aykas

The Aegean Agricultural Research Institute (AARI, Izmir, Turkey) has accepted the responsibility for establishing and maintaining the European Pepper Database (EPDB). A first call for data was sent in May 2002 to 17 countries; information was received from 11 countries. Following a second call to other ECP/GR members for updating the data included in the EPDB or providing new data, only three replies were received: Turkey and the Netherlands provided updates and Armenia new data for inclusion in the EPDB.

The EPDB contains a total of 6325 records from 17 institutions of 12 countries (Table 4). Three of the biggest collections (Germany, Hungary and Turkey) hold about 56% of the total number of accessions.

The structure of the database was organized according to the FAO/IPGRI *Multi-crop Passport Descriptors* (Table 5).

The database currently provides a standardized list of passport data recorded in 26 fields. A maximum of 19 fields are filled in for each accession. Table 6 shows the number of accessions per country and the number of descriptors used. The percentages of data entries in each descriptor field for all institutes are shown in Fig. 1.

Table 4. Contributions to the European Pepper Database

Country	No reply	Reply (data not received / not accessible)	Data received (no. of accessions)
Armenia			179
Bulgaria			258
Czech Republic			514
France		+	
Germany			1437
Greece			30
Hungary			1077
Italy		+	
Poland	+		
Portugal	+		
Romania			68
Russian Federation	+		
Slovakia			60
Spain			938
Sweden			11
The Netherlands			704
Turkey			1049
Yugoslavia FR	+		
Total			**6325**

Table 5. Passport descriptors adapted for the Pepper Database

Country	COUNTRY	Collecting data of original sample	COLLDATE
Institute code	INSTCODE	Status of sample	SAMPSTAT
Accession number	ACCENUMB	Collecting source	COLLSRC
Collecting number	COLLNUMB	Donor institute code	DONORCODE
Genus	GENUS	Donor number	DONORNUMB
Species	SPECIES	Other number(s) associated with the accession	OTHERNUMB
Subtaxa	SUBTAXA	Remarks	REMARKS
Accession name	ACCNAME	Location of safety-duplicates	DUPLSITE
Country of origin	ORIGCTY	Availability of characterization data	CHARAVAIL
Location of collecting site	COLLSITE	Availability of evaluation data	EVALAVAIL
Latitude of collecting site	LATITUDE	Acquisition data	ACQDATE
Longitude of collecting site	LONGITUDE	Acquisition type of the accession	ACQTYPE
Elevation of collecting site	ELEVATION	Type of storage	STORTYPE

Table 6. Institutions contributing to the Pepper Database, number of accessions and number of descriptors

Country	**Institution**	**INSTCODE***	**No. of accessions**	**No. of descriptors**
Armenia	Research Center of Vegetables, Melons and Industrial Crops	ARM008	179	19
Bulgaria	Institute for Plant Genetic Resources "K. Malkov"	BGR001	258	13
Czech Republic	Genebank Department, Division of Genetics and Plant Breeding, Research Institute of Crop Production	CZE122	514	9
Germany	Institut für Pflanzengenetik und Kulturpflanzenforschung	DEU416	1437	14
Greece	Greek Genebank, Agricultural Research Center of Macedonia and Thrace, National Agricultural Research Foundation	GRC005	30	12
Hungary	Institute for Agrobotany	HUN003	647	18
	ZKI Vegetable Crops Research Institute	HUN004	430	9
The Netherlands	Botanical Garden, University of Nijmegen	NLD020	102	17
	Centre for Genetic Resources, the Netherlands, Plant Research International	NLD037	602	14
Romania	Suceava Genebank	ROM007	14	19
	Agricultural Research Station Simnic-Dolj	ROM008	51	19
	Fruit Growing Research Institute Maracineni-Arges	ROM009	1	19
	Agricultural Research Station Lovrin-Timis	ROM012	2	19
Slovakia	Research and Breeding Institute of Vegetables and Special Crops	SVK013	60	18
Spain	Generalidad Valenciana, Universidad Politécnica de Valencia, Escuela Técnica Superior de Ingenieros Agrónomos, Banco de Germoplasma	ESP026	938	11
Sweden	Nordic Gene Bank	SWE002	11	9
Turkey	Plant Genetic Resources Department, Aegean Agricultural Research Institute	TUR001	1049	19
Total			**6325**	

* INSTCODE = FAO institute code

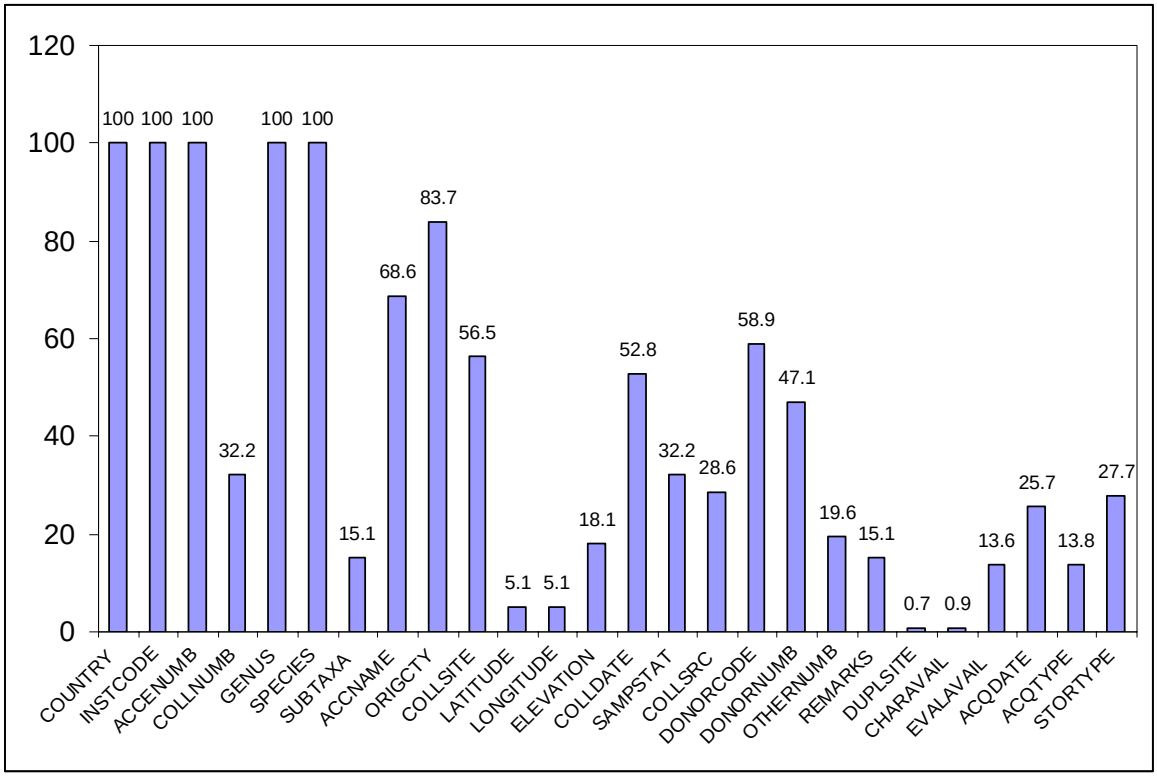

Fig. 1. Percentage data entries in each descriptor field for all institutes.

The database contains information on 6325 accessions representing 14 species (Table 7). The global distribution per species shows that *Capsicum annuum* is the most representative species in Europe with 88% of all accessions, and is represented in all countries.

Table 7. Species included in the Pepper Database

Species	No. of accessions	%	Countries holding the collection
Capsicum sp.	121	1.91	Germany, Spain, Hungary, The Netherlands
C. *annuum*	5611	88.71	All countries
C. *baccatum*	51	0.80	Germany, Spain, Hungary, The Netherlands
C. *cardenasii*	3	0.04	Germany, The Netherlands
C. *chacoense*	17	0.26	Germany, The Netherlands, Spain
C. *chinense*	115	1.81	Germany, Spain, Hungary, The Netherlands
C. *conicum*	11	0.17	Hungary
C. *eximium*	8	0.12	Germany, The Netherlands
C. *frutescens*	281	4.44	Germany, Spain, Hungary, The Netherlands, Turkey
C. *galapagoense*	5	0.07	Spain, The Netherlands
C. *microcarpum*	7	0.11	Germany
C. *pendulum*	34	0.53	Germany
C. *praetermissum*	6	0.09	Germany, The Netherlands
C. *pubescens*	52	0.82	Germany, Spain, The Netherlands
C. *testiculatum*	3	0.04	Hungary
Total	**6325**		

The analysis of data on the country of origin of collected accessions shows that *Capsicum* accessions originate from approximately 85 countries and the origin of 1031 accessions is unknown (Fig. 2). Armenia, Bulgaria, Greece, Romania, and Turkey hold their own collections. Accessions held by other countries are from various countries of origin. Because of the incomplete data it was not yet possible to identify the duplicate samples/accessions. Donor numbers and donor institute should be completed if this information exists.

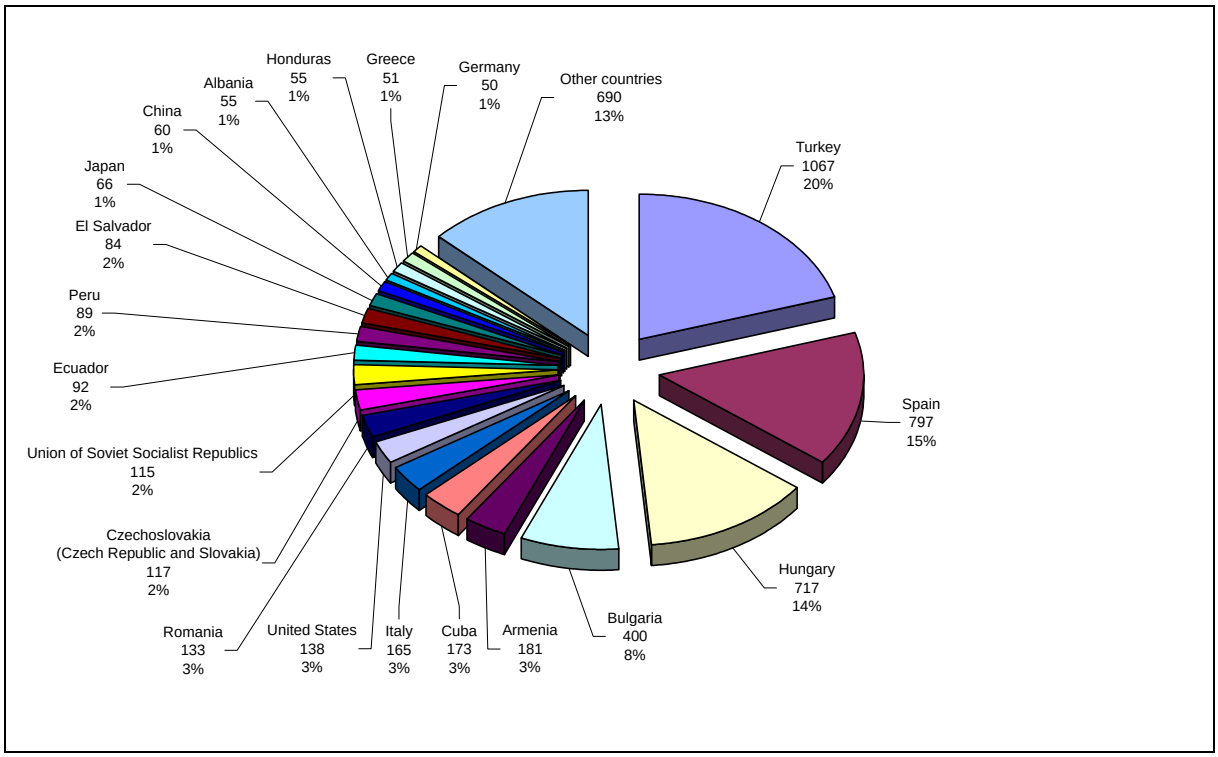

Fig. 2. Countries of origin of collected *Capsicum* genetic resources.

Updating remarks

The Pepper database was still one Excel file in 2004. During the Bari meeting, in September 2004, it was decided that the Pepper DB would adopt the structure of the Eggplant DB and plans were made to transfer software and knowledge from the Eggplant DB manager (Botanical and Experimental Garden, Radboud University, Nijmegen, the Netherlands) to the Pepper DB manager (AARI, Izmir, Turkey). In collaboration with CGN (Wageningen, the Netherlands), the Pepper DB was temporarily (2005) created and hosted by the Radboud University, and made available from its Web site (http://www.bgard.science.ru.nl/WWW-IPGRI-Capsicum/Pepperdb.htm). The transfer of the software and all data to AARI was done in June 2006 and work is in progress in order to make the DB available from AARI and IPGRI Web sites.

Tomato database: achievements

(Summary by Chair and Vice-Chair of the presentation given by Andrew Omelchenko)

At the first *ad hoc* meeting held in 2001 in Nijmegen, the Netherlands, the representative of the Vavilov Research Institute (VIR, St. Petersburg, Russian Federation) agreed to create a database of tomato germplasm held in European collections.

Passport data were requested from European institutions holding tomato germplasm and 17 of them (from 15 countries) replied. Some institutes sent not only MCPDs but also local passport descriptors which could not be easily converted into the MCPD format.

Different versions of Windows in English and Russian gave translation problems; consequently many files were not readable after they had been saved in the Russian template. At the meeting in Bari (September 2004) the DB manager suggested requesting new listings from all partners to start again with uncorrupted files. In June 2006 the

inventory was ready, and work was in progress for uploading it as an on-line searchable database.

Altogether there are 18 806 tomato accessions in the inventory. Table 8 gives an overview of the accessions for which passport data have been provided so far. Some institutes which have contributed do not have a FAO code. The inventory shows that many descriptors are not documented (empty fields, e.g. Latitude, Longitude, Elevation, Author and Sub-author).

Table 8. Institutions which have provided passport data (Sept. 2004)

Country	INSTCODE*	Institute name	Total no. of accessions
Azerbaijan	AZE005	Scientific Research Institute of Vegetable Growing	25
Bulgaria	BGR001	Institute for Plant Genetic Resources "K. Malkov" (IPGR)	760
Estonia	EST001	Jogeva Sordiaretuse Instituut	14
France	FRA030	Institut National de la Recherche Agronomique (INRA)	1010
Germany	DEU001	Institute of Crop Science (BAZ)	4043
	DEU146	Institut für Pflanzengenetik und Kulturpflanzenforschung (IPK)	
Greece	GRC005	Greek Genebank	22
Hungary	HUN003	Institute of Agrobotany	1358
Moldova	MDA010	Centre for Plant Genetic Resources of Moldova	490
The Netherlands	NLD037	Centre for Genetic Resources, the Netherlands (CGN)	1186
	NLD020	Botanical Garden – University	
NGB	SWE002	Nordic Gene Bank	54
Romania	ROM007	Suceava Genebank	66
	ROM008	Agricultural Research Station Simnic-Dolj	
	ROM012	Statiunea de Cercetari Agricole Lovrin	
Russian Federation	RUS001	N.I. Vavilov Research Institute of Plant Industry	7044
Spain	ESP026	Banco de Germoplasma, Universidad Politecnica de Valencia	2211
	ESP027	Banco de Germoplasma de Horticolas, Servicio de Investigacion Agraria	
Turkey	TUR001	Plant Genetic Resources Dept. (AARI)	477
United Kingdom	GBR006	Genetic Resources Unit, Horticulture Research International	46
Total			**18806**

* INSTCODE = FAO institute code

Eggplant (EGGNET project) database: achievements

Gerard van der Weerden

The first version of the Eggplant Database was created in 2000 and contained the records supplied by the EGGNET partners available at that time. Subsequently the EGGNET database was adapted to international standards, i.e the FAO/IPGRI *Multi-crop Passport Descriptors*. At the EGGNET full meeting in Thessaloniki, Greece (2003) it was decided to overhaul the EGGNET Database completely in order to follow international developments and to create a relatively simple, platform-independent, Web-based searchable EGGNET database.

This overhaul consisted of the following stages:

- Converting the SAS-based EGGNET Database into open source MySQL database;
- Programming of Web-based input and output modules for the EGGNET database;
- Horizontal coupling of the EGGNET Database with tables, illustrations, and literature references;
- Making the EGGNET Database and its coupled files searchable via a search form on the Web, including export and download files.

The work was carried out from November 2003 to December 2004. In September 2004 the database was operational and it was presented at the Solanaceae Working Group Meeting held in Bari. The results, so far, have been discussed and useful comments have been used for further development of the EGGNET Database.

The programming was done in 2004, and on the basis of the experience obtained when uploading different files provided by the EGGNET partners, the database manager was able to improve it in such a way that it is now considered to be one of the most advanced crop databases in Europe.

During the EGGNET project the database was called "EGGNET Database". After EGGNET the database will be continued as an ECP/GR Central Crop Database (CCDB) and therefore its name is changed to "ECP/GR Eggplant Database".

Discussion about future developments for each database (database managers)

The database managers recognized several technical problems encountered when receiving passport files from member countries, such as the use of different software or different versions of a given software, resulting in files' incompatibility during transfers. The transfer format should be Excel files in line with the MCPDs.

Though EURISCO exists, the Central Crop Databases remain essential because they contain more information (from different institutions or inventories) or different information (such as primary characterization data, photos). Given the diversity of technical problems encountered by the DB managers, it was proposed by A. Omelchenko (VIR) to create a chat forum where DB managers could exchange information. This forum was made available at www.vir.nw.ru/forum/ and was intended to be linked to ECP/GR Web site, but due to overwhelming SPAMs, it was momentarily deactivated. It was concluded that the Solanaceae DB managers should continue discussing and exchanging information when necessary.

Planning of safety-duplication of each collection under long-term conservation conditions

Current level of safety-duplication

During the meeting, participants were requested to provide information regarding the state of safety-duplication of genetic resources in their countries and whether they were willing to host black boxes or not. This information was completed after the meeting for the countries which did not send representatives to the Bari meeting. An overview is given in Appendix I. So far ten institutions from 23 countries have organized safety-duplicates, either under medium- or long-term conditions. Five institutions are able to offer black box facilities: IPK (Germany), ABI (Hungary), CGN (The Netherlands), NGB (Nordic countries) and BPGV (Portugal). The necessity and the possibility of having safety-duplicates, preferably under long-term conditions, were stressed and attending members were invited to plan and organize the safety-duplication of their genetic resources. Armenia and Austria immediately initiated arrangements with CGN during the meeting and work is in progress.

Regeneration and storage guide

It was agreed to produce a single minimum guide for successful regeneration and storage for all solanaceous crops which have similar floral biology. The draft guide for successful regeneration was presented and discussed. This guide was finalized after the meeting and agreed upon by WG members (see Appendix II).

Development of minimum primary descriptor lists

IPGRI descriptors are available for eggplant, *Capsicum* spp. and tomato; these descriptors are used by the different European institutions dealing with Solanaceae genetic resources, and often completed with other descriptors such as those of UPOV. In other words, each institution has its own set of descriptors and it was agreed in 2001 (first meeting in Nijmegen) that the development of a common minimum descriptor list per crop was necessary to harmonize the data to be entered in the CCDBs. Draft descriptor lists prepared before the meeting were presented and discussed during the meeting (Sept. 2004).

Working Group members were urged to use these descriptors (in addition to their own) and to provide the crop DB managers with the information, in order to upgrade the value of the DBs; the DB managers were requested to plan the insertion of these minimum descriptors into their DB structures.

Eggplant, Capsicum *spp. (sweet and hot pepper) and tomato*

The draft descriptor lists developed by the WG for these three crops (based on IPGRI descriptors) were submitted to IPGRI for revision. Some modifications were suggested by IPGRI and at time of going to press, these lists are being reviewed by the whole Working Group. The approved lists will be uploaded on the Solanaceae Working Group's Web page (http://www.ecpgr.cgiar.org/Workgroups/solanaceae/solanaceae.htm).

Physalis *and* Cyphomandra

- For *Physalis*, W. Palme (HBLVA, Austria) volunteered to grow in 2005 a set of accessions (provided by relevant partners) representative of the diversity of the genus and he produced a draft for *P. peruviana* and another one for *P. ixocarpa*.
- For *Cyphomandra*, a first draft was produced by J. Prohens (COMAV, Spain) after the meeting and he volunteered to contact specialists in this crop in order to improve the draft; work is in progress.

At time of going to press, the descriptors for *Physalis* and *Cyphomandra* are still under development; these draft versions are already available on the Web page and will be replaced by final versions, when ready.

Secondary characterization

There was a consensus agreement that secondary characterization is not yet a priority of the WG, since databases, regeneration and storage, as well as primary characterization deserve the full attention of the members. Therefore the discussions about this topic (which traits have priority, which protocols for measuring them) are postponed to a later stage.

Taxonomy

Surveys carried out so far indicated that there is a frequent misuse of taxonomy in the passport data provided by the members of the WG on Solanaceae, and there was a consensus during the meeting that this topic was a real problem for most members. Therefore, a list of useful Web addresses was established for Solanaceae taxonomy as well as for Solanaceae genetic resources (Table 9); see also the Solanaceae Working Group Web page (http://www.ecpgr.cgiar.org/Workgroups/solanaceae/U_links.htm).

Table 9. Useful Web addresses for Solanaceae

Genetic Resources Information Network (USDA/ARS)	http://www.ars-grin.gov/npgs
TROPICOS (Missouri Botanical Garden)	http://mobot.mobot.org/W3T/Search/image/iix256.html
Mansfeld database (IPK)	http://mansfeld.ipk-gatersleben.de/mansfeld/Query.htm
Tomato Genetics Resource Center (Univ. California, Davis)	http://tgrc.ucdavis.edu/
Nijmegen Botanical Garden (Radboud Univ. of Nijmegen)	http://www.bgard.sci.kun.nl
World Information and Early Warning System on Plant Genetic Resources (FAO)	http://apps3.fao.org/wiews/
International Plant Name Index	http://www.ipni.org/ipni/query_ipni.html
ECP/GR Eggplant Database	http://www.bgard.sci.kun.nl/WWW-IPGRI/eggplant.htm

In addition, resource persons for taxonomic identification are as follows (full contact details in list of participants, Appendix VI):

- Solanaceae: Gerard van der Weerden (G.vanderWeerden@science.ru.nl)
- Eggplant and wild relatives: Marie-Christine Daunay (daunay@avignon.inra.fr)

Status of National Collections

Presentations were given by G. Aleksidze (Georgia) and N. Popandron (Romania). Additional contributions updating the data previously published were provided by representatives from Armenia, Bulgaria, the Czech Republic, Italy, Poland and Turkey. All are included in Part II of this report.

EU GENRES project

The European Union has since long recognized the importance of supporting the management of genetic resources. A first programme entitled Regulation 1467/94 launched three calls for proposals in 1996, 1997 and 1999 and financed in particular the EGGNET project (January 2000-March 2005) dealing with cultivated eggplants and their wild relatives. A second programme (Regulation 870/2004) was launched by a first call for proposals in September 2005, and a second call in April 2006. A first attempt at preparing a proposal for *Capsicum* was made in 2004 by Radboud University Botanical and Experimental Garden, Nijmegen and CGN, Wageningen but was soon abandoned once the financial conditions offered by the EU were known. At the September 2004 meeting in Bari, the Solanaceae WG acknowledged that a Solanaceae project should be prepared, but unfortunately nobody volunteered to coordinate it because of the heavy paper work it implies.

Excursions

Visit to the genebank

The facilities of the IGV were shown to the participants and IGV scientists presented their achievements and current projects.

Visit to experimental fields

On the day following the ECP/GR meeting, a field visit was organized with all participants (EGGNET and ECP/GR) to the experimental farm located at Metaponto (Azienda Agricola Sperimentale Dimostrativa "Pantanello") where EGGNET eggplant accessions were regenerated. The plants in the field gave a good overview of the morphological diversity

available in cultivated eggplants and related species, and the participants spent a long time investigating and enjoying this diversity.

Conclusion

This *ad hoc* meeting of the Solanaceae WG provided the participants with an outstanding overview of the Solanaceae WG achievements since 2001 and of its next objectives. In spite of the changes from one meeting to the next of the countries represented at the three *ad hoc* meetings held so far in 2001, 2003 and 2004, and sometimes the insufficient involvement of the members in solanaceous crops, significant advances were achieved. Four of the databases for the five crops taken in charge by the Group are already searchable on-line, and the fifth one (Tomato Database) is progressing towards this. These databases already contain many data from country members, and new data are still being entered progressively.

The Eggplant DB is the most advanced type of DB available until now at ECP/GR because it includes, in addition to the passport data, primary characterization data, pictures and literature information. The same structure has been successfully transferred and is being used for the Pepper DB, because of the determination of the Eggplant and Pepper DB managers and of the WG Chair and Vice-Chair. In June 2006, ECP/GR supported a successful 4-day mission in order to achieve this transfer of structure, know-how and knowledge to the Pepper database manager of AARI, Turkey.

Other objectives such as the development of a minimum guide for seed regeneration and storage and of a minimum descriptor list for each crop, and solutions for taxonomic identification of wild material, have been completed according to the workplan, of which an updated version (March 2006) is provided in Appendix III.

Further objectives, such as the organization of safety-duplicates and the detection of duplicates and gaps among European collections will now be prioritized.

It takes time for people to learn about the structure and the way ECP/GR Working Groups are operating, but in spite of this, the Solanaceae WG has made tremendous progress in its short life. All its actions aim at harmonizing and rationalizing Solanaceae genetic resources management in Europe, through task sharing, collegial decisions and friendly collaboration.

PART II. PRESENTATIONS AND PAPERS

Status of the national Solanaceae collections in Armenia

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Introduction

Armenia is well known for its rich plant biodiversity. Wild relatives of vegetable crops include 275 species, 8 species of which belong to the Solanaceae family. A large number of landraces were cultivated for centuries in Armenia.

Like many countries, Armenia faces heavy genetic erosion. Not only wild relatives but also landraces are now threatened with replacement by modern, often foreign varieties. Measures combining *ex situ* and *in situ*/on-farm conservation are urgently needed to preserve the extremely rich and unique agrobiodiversity of Armenia.

Solanaceae collections in Armenia

The Armenian Solanaceae germplasm collections include 1420 accessions of cultivated and wild species belonging to 5 genera. The current status of the collections is shown in Table 1.

Table 1. Current status of the Armenian national Solanaceae collections, 2004

Species	No. of accessions			
	Total	Entered in the National Database	Evaluated/ characterized	Regenerated in 2004
Solanum L.	480	262	250	45
Capsicum L.	350	210	170	45
Lycopersicon Tourn.	550	280	200	80
Physalis	34	34	10	7
Cyphomandra	6	6	6	
Total Solanaceae	**1420**	**802**	**636**	**167**

The taxonomic composition of the collections is shown in Table 2. The genera *Solanum* and *Capsicum* are each represented by 10 species, genus *Lycopersicon* by 5 species, genus *Physalis* by 7 species and genus *Cyphomandra* by 10 species.

Ex situ *conservation*

Since there is no central genebank in Armenia, the collections are spread between several institutions.

The base collection of vegetable crops is housed at the Scientific Center of Vegetable and Industrial Crops (SCVIC) (under the authority of the Ministry of Agriculture). It contains 1037 accessions of all Solanaceae vegetable crops cultivated in Armenia. The other two smaller collections are held by the Institute of Botany (IB, Yerevan) (84 accessions) and the Armenian Agricultural Academy (AAA) (29 accessions) (Table 3).

Table 2. Taxonomic composition of the Armenian eggplant, pepper, tomato, *Physalis* and *Cyphomandra* collections

Genus/species	No. of accessions
Eggplant (*Solanum* L.)	
Solanum melongena L.	458
Solanum esculentum Dunal	2
Solanum aethiopicum L.	2
Solanum ovigerum Dunal	2
Solanum citrullifolium A. Braun	3
Solanum macrocarpon L.	2
Solanum sisymbriifolium Lam.	3
Solanum integrifolium Poir. in Lam.	3
Solanum dulcamara L.	1
Solanum nigrum L.	4
Total eggplant	**480**
Pepper *(Capsicum* L.)	
Capsicum annuum var. *grossum* (L.) Sendtn.	94
Capsicum annuum var. *longum* Sendtn.	240
Capsicum anomalum Franch. & Sav.	2
Capsicum chacoense Hunz.	2
Capsicum chinense Jacq.	2
Capsicum eximium Hunz.	2
Capsicum pendulum Willd.	2
Capsicum baccatum L.	2
Capsicum pubescens Ruiz & Pav.	2
Capsicum frutescens L.	2
Total pepper	**350**
Tomato *(Lycopersicon* Tourn.)	
Lycopersicon esculentum Mill.	505
Lycopersicon pimpinellifolium (Juslen.) Mill.	16
Lycopersicon cheesmanii Riley	6
Lycopersicon peruvianum (L.) Mill.	18
Lycopersicon hirsutum Humb. & Bonpl.	14
Total tomato	**550**
Physalis	
Physalis alkekengi L.	17
Physalis franchetii Mast.	4
Physalis coztomatl Moc. & Sessé ex Dunal	2
Physalis angulata L.	2
Physalis heterophylla Nees	2
Physalis peruviana L.	3
Physalis philadelphica Lam.	2
Total *Physalis*	**34**
Cyphomandra	
Cyphomandra abutiloides Griseb.	4
Cyphomandra betacea (Cav.) Sendtn.	2
Total *Cyphomandra*	**6**
Total Solanaceae	**1420**

Table 3. Distribution of collections in holding institutes and type of material

Institute*	Crop	No. of accessions			
		Total	**Landraces**	**Wild**	**Breeding material**
SCVIC	Eggplant	468	113	17	315
	Pepper	333	205	7	121
	Tomato	480	80	30	370
	Physalis	23	10	5	6
	Cyphomandra	3	3		3
	Total	**1307**	**411**	**59**	**815**
IB	Eggplant	7		7	
	Pepper	7		7	
	Tomato	60		17	43
	Physalis	7			7
	Cyphomandra	3			
	Total	**84**		**31**	**50**
AAA	Eggplant	5			5
	Pepper	10			10
	Tomato	10			10
	Physalis, *Cyphomandra*	4			4
	Total	**29**			**29**

* SCVIC = Scientific Center of Vegetable and Industrial Crops
IB = Institute of Botany
AAA = Armenian Agricultural Academy

Armenia is a micro gene centre for many landraces, including the Solanaceae. Some of the material in the Armenian Solanaceae collections is particularly valuable, e.g. primitive and wild species of eggplant, pepper, tomato, landraces and local cultivars (home garden crops, endemic plants).

Old local varieties and forms of eggplant such as 'Yerevani Tegakan' and 'Haykakan Yerkar' have been grown for many centuries.

The genus *Solanum* includes samples of local cultivars and landraces of eggplant: *S. melongena* subsp. *occidentale* (var. *falcatum* Haz., var. *yerevanski* Haz., var. *bulgaricum* Fil., var. *kashgaticus* Fil., var. *ramosissimum* Haz., var. *izmir* Haz.); *S. melongena* subsp. *orientalis* Fil. (var. *depressum* Bailey, var. *serpentinum* Bailey, var. *pekinense* Fil.); *S. melongena* subsp. *meridionale* (var. *esculentum* Bailey, var. *americanus* Fil., var. *palestinicum* Fil.).

The genus *Capsicum* includes samples of local cultivars and landraces of sweet pepper: *C. grossum* (var. *ovatum*, var. *cordatum*, var. *latum*, var. *zilindricum*, var. *pomifera*), and hot pepper: *C. longum* (var. *brevidactylus*, var. *longum*, var. *conoides*, var. *proboscideum*, var. *acuminatum*, var. *dactylus*, var. *cerasiforme*).

Characterization, evaluation and regeneration

Most accessions have been characterized for several morphological traits according to the VIR descriptors. The accessions are regenerated in different ecogeographical zones. Characterization and evaluation data are computerized.

Documentation

Until recently the documentation of collections was recorded manually. Since 2001, when the National Database (NDB) of seed *ex situ* collection was designed by the PGR Unit of Armenia on the basis of standard descriptors, the passport data of collections including vegetables were entered into the National Database and became available for uploading into the EURISCO catalogue. When entered into the National Collection the data were forwarded to the collection holding institute in electronic format. Thus, the documentation is now carried out in electronic format. However, the focus so far has been on passport data. Future

activities will deal with characterization, and efforts are needed to design a complementary database integrated to the current one. At present characterization data for 636 accessions are available on paper only.

Additional training on database design (passport + characterization) is a first priority.

The documentation status of the Solanaceae collections is presented in Table 4.

Table 4. Documentation status of the Solanaceae collections

Institute	Crop	Total no. of accessions	Accession data entered in the NDB	
			No.	%
SCVIC	Eggplant	468	250	54.1
	Pepper	333	197	59.1
	Tomato	480	210	43.7
	Physalis	23	23	100
	Cyphomandra	3	3	100
	Total	**1307**	**683**	52.2
IB	Eggplant	7	7	100
	Pepper	7	7	100
	Tomato	60	60	100
	Physalis	7	7	100
	Cyphomandra	3	3	100
	Total	**84**	**84**	100
AAA	Eggplant	5	5	100
	Pepper	10	10	100
	Tomato	10	10	100
	Physalis, *Cyphomandra*	4	4	100
	Total	**29**	**29**	100

Collecting activities

Over 329 accessions of eggplant, 316 accessions of pepper, 360 accessions of tomato, 34 accessions of *Physalis* and 6 accessions of *Cyphomandra* have been collected from various zones of Armenia in the period 2003-2004. The greater part of the collected material consists of landraces and wild relatives. A number of local forms have also been collected.

Taking into account the alarming increase of negative factors affecting biodiversity, these collecting missions are of paramount importance. Eight genera of vegetables were listed in the "Red Data Book" in 1988. Today this figure is much higher and a clear picture of the situation is expected to be drawn during the regular missions.

Future activities

The efforts within the ongoing activities should be focused on:

- identification of the gaps in the collections;
- collecting and regeneration of material not represented in the collection (local landraces and wild relatives);
- documentation and monitoring of both the collections and the database;
- field evaluation;
- documentation of evaluation data;
- introduction and development of new varieties;
- *in situ* conservation of genetic resources; and
- improvement of storage facilities (medium- and long-term).

Web resources

General information on plant genetic resources activities in Armenia can be found on the following Web sites:

- Genebank of the National Academy of Sciences of Armenia (NAGB) (www.freewebs.com/nagb); and
- Plant Genetic Resources in Central Asia and Caucasus (www.cac-biodiversity.org - Section "Armenia").

Evaluation of Solanaceae genetic resources in Bulgaria[11]

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Since 1985, the Institute for Plant Genetic Resources of Sadovo (IPGR), the Agricultural University of Plovdiv and the Institute of Genetics in Sofia have carried out extensive evaluation trials on eggplant, pepper and tomato genetic resources. These are summarized in Table 1.

Table 1. Evaluation of Solanaceae genetic resources in Bulgaria

Crop	No. of accessions evaluated	Traits
Eggplant	150	Set of 17 morphological traits
	85	Dry matter, total sugars and crude protein content
	81	Resistance to *Phytophthora capsici* and *Verticillium dahliae*
	30	Seed protein content
Pepper	250	Plant height, branching, content of vitamin C, total sugars, dry matter content (%) and verticillium wilt resistance
Tomato	174	Resistance to *Sphaerotheca fuliginea*
	275	Resistance to *Alternaria solani*
	180	Resistance to fusarium wilt, powdery mildew and tobacco mosaic virus

The information was entered into evaluation databases using several software packages (VISITREND, VIVIPLOT, AIDA, CCADMS). These databases provide easy access to the evaluation data for analysis and selection of accessions, in order to accelerate the breeding process for solanaceous crops and to promote the exchange of material.

[11] *Summarized by M.C. Daunay and W. van Dooijeweert*

Current status of the Solanaceae collection in the Czech Republic

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Genetic resources of vegetable crops from the Solanaceae family – eggplant (*Solanum melongena* L.), pepper (*Capsicum annuum* L.), tomato (*Lycopersicon esculentum* Mill.) and *Physalis* (*P. edulis* L.) – are maintained by the Research Institute of Crop Production Prague-Ruzyne (RICP), Genebank Department, Olomouc Station.

The eggplant collection

The collection of eggplant is represented only by 25 accessions. Eggplants are regenerated in isolation cages. The following 20 characters, taken from the *Descriptors for Eggplant* (IBPGR 1990), are used for characterization:

Descriptors used for evaluation of the Czech eggplant collection

1. Plant growth habit	11. Fruit shape
2. Leaf blade length	12. Fruit colour at commercial ripeness
3. Leaf blade width	13. Fruit colour at physiological ripeness
4. Leaf blade lobing	14. Fruit calyx length
5. Leaf blade tip angle	15. Fruit calyx prickles
6. Leaf prickles	16. Fruit position
7. Number of flowers per inflorescence	17. Number of seeds per fruit
8. Corolla colour	18. Seed colour
9. Fruit length/breadth ratio	19. Seed size
10. Fruit curvature	20. 1000-seed weight

The pepper collection

The collection of pepper includes 508 accessions. The greater part of this collection is represented by old open-pollinated varieties from former Czechoslovakia, Hungary and the former Soviet Union (Fig. 1). New accessions have been obtained from seed companies in the Czech Republic and Poland.

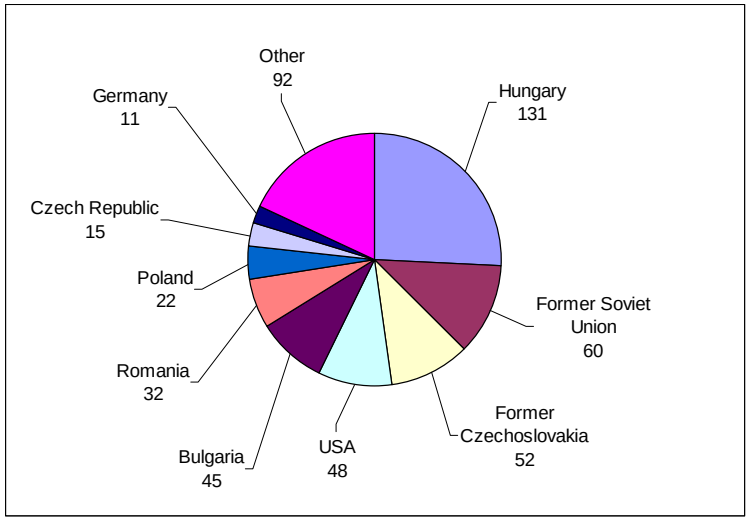

Fig. 1. Structure of the pepper collection according to country of origin (number of accessions).

During regeneration of accessions two systems were used to prevent outcrossing. In the period from 1995 to 1999 the plants were grown in plastic tunnels. Before flowering the plants were isolated by special bags. After three weeks the bags were removed and the fruits were tagged by cotton thread. The seeds were taken from these fruits. Since 2000 the pepper plants have been grown in isolation cages. We use bees and bumble bees for pollination. The harvested seeds are stored at -20°C.

Pepper is characterized according to the following 31 descriptors taken from the *Descriptors for* Capsicum *(*Capsicum *spp.) (*IPGRI, AVRDC and CATIE 1995):

Descriptors used for evaluation of the Czech pepper collection

1. Stem pubescence	16. Fruit colour at intermediate stage
2. Plant height	17. Fruit position
3. Plant growth habit	18. Fruit set
4. Leaf pubescence	19. Fruit colour at mature stage
5. Mature leaf length	20. Fruit shape
6. Number of flowers per axil	21. Fruit length
7. Flower position	22. Fruit width
8. Corolla colour	23. Fruit shape at pedicel attachment
9. Corolla spot colour	24. Neck at base of fruit
10. Anther colour	25. Fruit shape at blossom end
11. Filament colour	26. Fruit cross-sectional corrugation
12. Stigma exsertion	27. Fruit surface
13. Calyx margin	28. Seed colour
14. Calyx annular constriction	29. 1000-seed weight
15. Anthocyanin spots or stripes	30. Fruit dry matter content
	31. Ascorbic acid content and capsaicin content

Dry matter content was assessed on 381 accessions. It ranges from 3.5% to 25.6%. Most accessions (134) have a dry matter content between 4 and 5% (Table 2). Sweet pepper is characterized by low dry matter content and hot pepper by high dry matter content. Only two accessions of sweet pepper fall in the group with very high dry matter content.

Table. 2. Dry matter content in pepper accessions

Dry matter content	No. of accessions
Low (<4%)	6
Medium (4-7%)	227
High (8-11%)	123
Very high (>12%)	22

The tomato and Physalis *collection*

The tomato and *Physalis* collection consists of 1655 accessions. The main part of this collection is represented by old open-pollinated varieties from former Czechoslovakia, USA and the former Soviet Union (Table 1).

The cultivated species *Lycopersicon esculentum* Mill. is represented by 1593 accessions. It includes both indeterminate (1034 accessions) and determinate (559) plant growth types.

The group of wild species includes *L. hirsutum* Humb. (8 accessions), *L. chmielewskii* L. (1), *L. parviflorum* L. (3), *L. peruvianum* Mill. (1) and *L. pimpinellifolium* Mill. (8).

A small collection of *Physalis (*41 accessions) is also maintained at Olomouc.

New accessions of both species are acquired from seed companies, research institutes and during collecting missions.

Table 1. Structure of the Czech tomato and *Physalis* collection according to country of origin, species and growth type

Country of origin	No. of accessions
USA	333
Former Soviet Union	329
Former Czechoslovakia	129
Hungary	95
United Kingdom	80
Germany (DDR)	69
Italy	62
Germany (DEU)	66
The Netherlands	63
Poland	58
Other	371
Total	**1655**

Species	No. of accessions
L. esculentum Mill.	
growth type = determinate	559
growth type = indeterminate	1034
Total	**1593**
L. hirsutum Humb.	8
L. chmielewskii L.	1
L. parviflorum L.	3
L. peruvianum Mill.	1
L. pimpinellifolium Mill.	8
Physalis edulis L.	41
Total	**1655**

The tomato accessions are multiplied in the field. Every year 150 accessions are regenerated on average. The harvested seeds are stored in boxes at -20°C.

Accessions of tomato are evaluated for 45 characters according to the Czech national descriptor list for genus *Lycopersicon* Mill. (Pekárková-Troníčková *et al.* 1988). These descriptors, listed below, are similar to those of the *Descriptors for Tomato* (IPGRI 1996).

Descriptors used for evaluation of the Czech tomato collection

1. Hypocotyl colour
2. Primary leaf length
3. Primary leaf width
4. Plant growth type
5. Vine length
6. Stem pubescence density
7. Stem internode length
8. Foliage density
9. Leaf attitude
10. Leaf type
11. Degree of leaf dissection
12. Inflorescence type
13. Corolla colour
14. Corolla blossom type
15. Flower sterility type
16. Petal length
17. Sepal length
18. Style position
19. Style shape
20. Style hairiness
21. Stamen length
22. Dehiscence
23. Exterior colour of immature fruit
24. Presence of green (shoulder) stripes on the fruit
25. Predominant fruit shape
26. Fruit size
27. Fruit weight
28. Exterior colour of mature fruit
29. Ribbing at calyx end
30. Fruit shoulder shape
31. Pedicel length from abscission layer
32. Presence/absence of jointless pedicel
33. Width of pedicel scar
34. Flesh colour of pericarp (interior)
35. Colour (intensity) of core
36. Seed shape
37. 1000-seed weight
38. Seed colour
39. Number of days to maturity
40. Ripening uniformity of the whole plot
41. Fruit cross-sectional shape
42. Number of locules
43. Fruit blossom end shape and number of flowers per inflorescence
44. Radial cracking
45. Concentric cracking

General information

Activities on genetic resources follow the rules of the National Programme for plant genetic resources conservation and utilization in the Czech Republic and international standards.

Passport data of all collections are fully processed and computerized. They are available on the Web site (http//genebank.vurv.cz/genetic/resources/). Characterization data are gradually being recorded and computerized.

Table 3 presents the current status of regeneration and the available Solanaceae accessions.

Table 3. Current status of regeneration

Collection	Regeneration (%)	Available (%)
Eggplant	100	100
Pepper	95	90
Tomato	75	75

References

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Solanaceae genetic resources in Georgia

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Background and historical data

Vegetable crops belonging to the Solanaceae family (eggplant - *Solanum*, pepper - *Capsicum* and tomato - *Lycopersicon*) were introduced into Georgia from foreign countries at different times: tomato spread into Georgia in the 18th century from Russia; eggplant arrived in the 12th century from India; pepper was introduced later, in the 16th century, from Iran. They are nowadays widely spread and represent a major food source for the population. It is quite difficult to imagine the Georgian table without tomato, eggplant, or pepper (both types). In culinary terms, they are brought to the table in different forms: fresh, pickled or salted.

Solanaceae cultivation areas and yield in Georgia

According to the cultivated area tomato ranks first, followed by pepper and eggplant (Table 1).

Table 1. Solanaceae spread and yield in Georgia

Crop	Land area (ha)	Total yield (t)	Average yield (t/ha)
Eggplant	1789	14799	82.7
Pepper	2041	15550	42.1
Tomato	16413	154618	94.2

Vegetable crops consumption in Georgia

Vegetable consumption rations are presented in Table 2. The Solanaceae family is not identified separately, but this table shows how the population intensively uses vegetables: consumption per head is between 75 and 78 kg/year.

Table 2. Vegetables food balances in Georgia *(source: Reports of the Statistics Department of Georgia, 2002)*

	Year							
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Sown areas (x 1000 ha)	29	28	32	42	43	46	41	40
Average yield (t/ha)	14	13.6	15.1	9.2	9.6	9.3	10.2	10.6
Population (x 1000 persons)	4674	4558	4505	4470	4435	4401	4371	4343
Use per year (per head) (g)	84	86	93	88	80	75	80	82
Use per day (per head) (g)	230	236	255	241	219	205	219	225

Solanaceae genetic resources in Georgia

Eggplant, pepper and tomato varieties grown in Georgia are listed in Table 3.

Table 3. Local and introduced varieties in Georgia (x = local varieties created by local breeding at the Institute of Farming and its Breeding Stations in Gardabani, Gori and Imereti)

Eggplant	Local variety
'Gardabnis adgilobrivi'	x
'Universali'	
'Shavgvremani'	x
'Oni'	x
'Kometa'	
'Somkhuri-3'	x
'Almazi'	
'Chaika'	

Pepper	Local variety
'Qutaisiuri Mtsare'	x
'Spilos khortumi, Mtsare'	x
'Lastochka'	
'Megrulli Mtsare'	x
'Mskhvilkviteli Mtsare'	x
'Bumberazi' Mtsare'	x
'Bulgaruli tkbili'	
'Novocherski'	
'Belozerka'	
'Pioneri'	
'Kapitoshka'	
'Adgilobrivi mtsare'	x
'Beloziorka'	
'Svenetura mtsare'	x
'Khrustali'	
'Kristali'	
'Liga'	

Tomato	Local variety	Tomato	Local variety
'Damdzlevi'	x	'Promete'	
'Bzaris sakvirveleba'	x	'Zarnitsa'	
'Kransodaretsi'		'Vrania'	
'Adeula'		'Cheburashka'	
'Kubanski shtambovi'		'Permoga'	
'Krosi'		'Evrika'	
'Moldavski rani'		'Platina'	
'Prevoskhodni'		'Shiti'	
'Rani'		'Kubanis napiri'	
'Mailaki'		'Kapitani'	
'Gribouli erdiana'		'Zastava'	
'Pirmsho'	x	'Priziori'	
'Kolkhideli'		'Siuniki'	
'Beriuchekutskuli'		'Kheineti'	
'Erliane'		'Leblianjinski'	
'Fshavi'	x	'Rusichi'	
'Aragvi'	x	'Moskouri oseni'	
'Ermaki'		'Shavi Azibeki'	
'Utro'		'Korneni'	
'Titani'		'Giulkani'	
'Viqtorina'		'Viriadzi'	
'Volgogradski -595'		'Ikari-84'	
'Holandiuri -1'		'Revermuni'	
'Mskhvilnakofa-77'	x	'Renato'	
'Aisi'	x	'Ukrainski teplichni'	
'Laikhvi'	x	'Solnishko'	
'Sadeserto'	x	'Soliasns'	
'Khevsuruli'	x	'Karlsoni'	
'Akrima'		'Jiguli'	
'Soiuzi'		'Segrini'	
'Sauti'		'Riveti'	
'Danko'		'Donetski krupnoplodni'	

The number of varieties evaluated is shown in Table 4. There were no observations and evaluation on the wild forms of these crops.

Table 4. Varieties evaluated

Eggplant			Pepper			Tomato		
Total	**Introduced**	**Local**	**Total**	**Introduced**	**Local**	**Total**	**Introduced**	**Local**
9	6	3	17	10	7	69	57	12

Ex situ *collections of Solanaceae genetic resources*

The Solanaceae collections are held at the Institute of Farming (PGR centre – Genebank) and the Breeding Stations in Gardabani, Imereti and Gori.

In 2004 the Seed Genebank was created at the Institute of Farming. This new genebank is capable of storing 10 000 accessions at +4°C.

Tomato varieties held in the genebank are listed in Table 5.

Table 5. Tomato varieties held in the Seed Genebank at the Institute of Farming

Early vegetation (95-165 days)	Average vegetation (110-120 days)	Late vegetation (120-130 days)
'Permoga' 'Fshavi' x 'Maiaki'	'Sakonservo' x 'Kolkhideli' x	'Aragvi' x 'Bazris sakvirveleba' x 'Budiinovka'

x = local varieties created by local breeding at the Institute of Farming and its breeding stations in Gardabani, Gori and Imereti

The most popular varieties are:

- Eggplant: 'Gardabnuli', 'Shavgvremani', 'Gardabnuli' (ancient traditional variety; high yielding and good taste);
- Pepper: 'Qutaisuri' (high-yielding); 'Megruli', 'Spilos Khortumi' (used as pickles);
- Tomato: 'Bazris sakvitveleba' (landrace).

Each accession of these varieties is kept in the Genebank at +4°C, sample size = 2 g.

Documentation

Passport data

They include accession number, taxon, accession name, collecting number, characterization of collecting site, geographical coordinates, country of origin, breeder and pedigree. All passport data are computerized.

Characterization and evaluation data

Descriptors used for the evaluation of eggplant, pepper and tomato in Georgia include morphological characters (plant, leaf, flower, fruit, seed), biological characters (phenology, vegetation period, disease resistance) and agronomic characters (yield, chemical composition). IPGRI descriptor lists are used for characterization and evaluation.

The software used is Access.

Descriptors for tomato

Phenological characters
Number of days from emergence to flowering
Number of days from emergence to first fruit formation
Number of days from flowering to first fruit formation
Number of days from emergence to technological ripeness

Morphological characters
Plant height
Stem - height of main stem; stem - foliage; stem - pubescence
Leaf size (cm); leaf type; leaf surface; leaf colour
Inflorescence type, inflorescence texture
Flower size; flower type; fruit type; fruit weight (g); fruit surface; fruit colour
Seeds - seed number per fruit; seeds - 1000 seed-weight; colour

Biological characters
Seasonality

Agronomic characters
Yield of marketable fruits per hectare (kg)

Biological and technological evaluation of fruits
Dry matter content (%)
Total sugar content (%)

Storage conditions

Medium-term storage.
Seeds are kept at +4°C, average sample size 2-4 g.

Disease resistance

The Solanaceae family is affected by various pests (potato beetle, nematodes, soil pests, greenhouse whitefly) and diseases (*Phytophthora, Verticillium, Fusarium, Cladosporum, Septorium,* viral and bacterial diseases).

The tomato varieties 'Evrika' and 'Soiuzi' and eggplant varieties 'Almazi' and 'Chaika' are resistant to tracheomycoses.

Pepper varieties 'Kristali' and 'Bulgaruli' have medium resistance against *Fusarium*.

Tomato varieties 'Krosi 525', 'Bazris sakvirveleba' 'Kolkhideli', 'Fshavi' and 'Aragvi' are more resistant to *Septoria* and *Phytophthora.*

Current status of the Solanaceae collection in the Bari Gene Bank

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General information

In Italy the major areas of Solanaceae production are mainly concentrated in the southern regions: Sicily, Apulia and Campania. Emilia Romagna is the only region in the North with significant production. To compare regional Solanaceae production and cultivated area with that of Italy, data are quoted from the Annuario Statistico Italiano published by ISTAT (2003). Table 1 shows production and main growing areas of eggplant (*Solanum melongena*), sweet pepper (*Capsicum annuum*) and tomato (*Lycopersicon esculentum*) in Italy.

Table 1. Production and main growing areas (regions) of eggplant (*S. melongena*), sweet pepper (*C. annuum*) and tomato (*L. esculentum*) in Italy

A. Open field										
Species	**Sicily**		**Apulia**		**Campania**		**Emilia Romagna**		**Italy**	
	ha[(1)]	**t[(2)]**	**ha**	**t**	**ha**	**t**	**ha**	**t**	**ha**	**t**
S. melongena	2.1	48.7	1.3	39.2	2.2	80.8	0.1	4.2	10.6	289.6
C. annuum	2.0	52.5	2.1	49.3	1.3	34.0	0.1	3.8	12.2	286.6
L. esculentum[(3)]	5.9	103.6	37.4	2641.6	7.6	414.8	29.4	1786.7	102.9	6219.5
L. esculentum[(4)]	-	-	2.0	70.7	1.2	76.5	0.4	27.5	25.7	986.7
B. Protected crop										
Species	**Sicily**		**Apulia**		**Campania**		**Emilia Romagna**		**Italy**	
	ha	**t**	**ha**	**t**	**ha**	**t**	**ha**	**t**	**ha**	**t**
S. melongena	1.1	47.9	0.01	0.6	0.2	10.0	0.05	3.5	1.8	80.6
C. annuum	1.2	44.5	0.02	0.9	0.4	22.9	0.02	1.4	2.3	93.9
L. esculentum	4.0	276.9	0.9	7.8	1.0	75.3	0.08	6.1	7.7	528.4

(1) = (x 1000)
(2) = (x 1000)
(3) = processing
(4) = fresh market

The regions with the highest open-field production of eggplant, tomato and sweet pepper are Campania, Apulia and Sicily respectively. Protected growing accounts for about 2000 ha and is mostly located in Sicily and Campania. A long tradition of eggplant, pepper and tomato growing has generated a wide natural diversity for these species. However, as reported in *Italian Horticulture* (Grassi *et al.* 1998), pepper hybrids, which are usually foreign-bred, have almost completely replaced the old varieties. These older varieties are still grown to target special market niches. F1 hybrids are used in tomato too. The oldest 'San Marzano' cultivar is still grown in a limited area of the Campania region where several local ecotypes are cultivated. In eggplant different cultivars basically distinguished by fruit form (round-globose, oval, and elongated) are used. For each type there are local ecotypes and hybrids that vary in skin colour.

Table 2 summarizes the main Italian institutions involved in collecting and safeguarding Solanaceae collections. Major collections are held by:

- IGV-CNR (Istituto di Genetica Vegetale-Consiglio Nazionale delle Ricerche), Bari for *Lycopersicon* spp.;
- DiVAPRA (Dipartimento di Valorizzazione Protezione delle Risorse Agroforestali) – University of Torino for *Capsicum* spp.;
- Istituto Sperimentale per l'Orticoltura, Pontecagnano (Salerno) for *Solanum* spp.

Table 2. Main Italian institutions involved in collecting and safeguarding Solanaceae *(source: SAVE/Monitoring Institute 2002)*

Species	Institutions	No. of accessions.
Lycopersicon spp.	IGV-CNR Bari	560
	Istituto Sperimentale per l'Orticoltura – Salerno	298
	DiVAPRA – University of Torino	- (*)
	ARSIA – Toscana region – Firenze	- (*)
	Dipartimento di Biologia Vegetale e Biotecnologie Agroambientali – University of Perugia	- (*)
	ARSSA – Abruzzo region – University of Perugia	- (*)
	Consorzio tutela Pomodoro "San Marzano" – Salerno	- (*)
Capsicum spp.	IGV-CNR Bari	167
	Istituto Sperimentale per l'Orticoltura – Salerno	134
	DiVAPRA – University of Torino	400
	Dipartimento di Biologia Vegetale e Biotecnologie Agroambientali – University of Perugia	- (*)
	ARSSA – Abruzzo region – University of Perugia	- (*)
	Comitato promotore dei Peperoni di Senise – Potenza	- (*)
Solanum spp.	IGV-CNR Bari	53
	Istituto Sperimentale per l'Orticoltura – Salerno	140
	DiVAPRA – University of Torino	- (*)
	ARSIA – Toscana region – Firenze	- (*)

(*) = small collection
ARSIA = Azienda Regionale per lo Sviluppo e l'Innovazione nel settore Agricolo
ARSSA = Agenzia Regionale per i Servizi di Sviluppo in Agricoltura - Abruzzo

Status of collections

Collecting missions are organized by IGV in collaboration with national and/or foreign scientists to collect different crop species in Italy and other Mediterranean countries. Usually one collecting mission is organized per year to collect landraces, local forms and ecotypes of different vegetable crops including Solanaceae species.

The collections cover different types of accessions, of which the most valuable are the old national cultivars and landraces of tomato and pepper collected in southern Italy. Table 3 lists the number of accessions per genus/species for tomato and pepper collections. Most of the pepper accessions belong to *Capsicum annuum* (116) while *Lycopersicon esculentum* (145) is the most represented species in the tomato collection (Daunay *et al.* 2003). The eggplant collection is the smallest one and includes 53 entries of *Solanum melongena* and 3 of *S. aethiopicum*.

Table 3. Species and number of accessions of pepper and tomato collections maintained at IGV, Bari

Species	No. of accessions
Capsicum spp.	30
C. annuum	116
C. chinense	5
C. frutescens or *chinense* (?)	1
C. esculentum	1
C. frutescens	12
C. luteum	1
C. pendulum	1
Total *Capsicum*	**167**

Species	No. of accessions
Lycopersicon spp.	73
L. cheesmanii	11
L. chilense	4
L. chmielewskii	2
L. esculentum	145
L. glandulosum	11
L. hirsutum	29
L. parviflorum	2
L. pennelli	2
L. peruvianum	91
L. pimpinellifolium	190
Total *Lycopersicon*	**560**

Multiplication and seed regeneration

The method is similar for the three species: collected and/or stored accessions with a low germination rate (<85%) or a small amount of seeds are subject to a regeneration programme; 10 plants grown in greenhouse after being sown in paper pots are transplanted into the open field; spacing is about 80 cm between rows and 30-40 cm (2.7 plants/m^2) within rows. Localized irrigation methods (drip or perforated hose) are used, while basal fertilizer is broadcast over the experimental area and harrowed in 5 days before sowing. Manual weeding is carried out. Seeds are extracted from fruits collected on 3 isolated plants in the centre of each plot (Fig. 1).

Fig. 1. Eggplant isolators.

Characterization/evaluation

Agromorphological, biochemical and molecular descriptors, mainly those recommended by IPGRI, are used to characterize the collections.

This activity is carried out when the collections are multiplied inside or outside our Institute under nationally or internationally financed projects. Parts of the tomato collection were screened many years ago for some plant and fruit descriptors while the small eggplant collection has been included in the EGGNET Project (EU Project GENRES CT113-99). An

evaluation programme to improve the re-utilization of pepper landraces in the southern regions of Italy is in progress. Twenty quantitative and qualitative descriptors from the IPGRI *Descriptors for* Capsicum (IPGRI, AVRDC and CATIE 1995) are used, including capsaicin content, fruit colour and vitamin C content.

Storage/database

Before storage, seeds of each accession are cleaned, dried, and tested for viability. Base collections are stored in aluminium cans at -20°C for long-term storage; working collections are stored in aluminium foil bags under vacuum at 0°C and 30% air moisture in the store room.

All accessions are documented for minimum passport data in the information system for data management, PHP3. Access to the database is available through the Internet on IGV's Web site (www.igv.cnr.it). A minimum of 10 descriptors are included, with incomplete data for some accessions.

Concluding remarks

The Solanaceae germplasm collection stored in the IGV genebank can be regarded as representative of the agrodiversity in Italy. More work is needed in collecting Solanaceae in order to fill gaps, in research on regeneration methodology to avoid erosion in the genebank, and in national and international cooperation in database management. Agromorphological, biochemical and molecular characterization of the Solanaceae collections are very important aims to improve utilization and make optimum use of the stored materials. Finally, more attention must be paid to improving on-farm conservation. Cooperation with regional institutions and farmers' associations is a current and very interesting issue for germplasm preservation in Italy.

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Solanaceae germplasm maintained in the Polish Gene Bank

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Status of the Solanaceae collection

The Solanaceae collection includes 1165 accessions of cultivated and wild species belonging to 4 genera. The current status of the collection is shown in Table 1.

Table 1. Present status of Solanaceae germplasm, Skierniewice 2004

Species / Names	No. of accessions				
	Total	Passport data	Evaluation / Characterization	Seed in long-term storage	Regeneration 2003-2004
Solanum melongena Eggplant (Oberzyna)	13	13		13	
Capsicum annuum Pepper (Papryka)	201	201	65	201	
Lycopersicon esculentum Tomato (Pomidor)	893	893	817	893	101
Physalis ixocarpa Husk tomato (Miechunka pomidorowa)	6	6	3	6	
Lycopersicon spp. (Wild species)	52	52		52	
Total	**1165**	**1165**	**885**	**1165**	**101**

The collection covers different types of accessions; the most valuable are the old national cultivars and landraces of tomato and pepper collected in Poland and other countries. The distribution of accessions according to type of material is shown in Table 2.

Table 2. Number of Solanaceae accessions per type of material, Skierniewice 2004

Species	Type of material				Total
	Advanced cultivars	Landraces	Breeding lines	Wild species	
Eggplant	6	7			13
Pepper	57	142	2		201
Tomato	645	190	58	52	945
Husk tomato	4	2			6
Total	**712**	**341**	**60**	**52**	**1165**

Storage and regeneration

The seeds are deposited in controlled storage in the national genebank located at the National Centre for Plant Genetic Resources (Plant Breeding and Acclimatization Institute, Radzików). The temperature in the storage chambers is 0°C/-18°C and the moisture content of the seeds, depending on species, 5-7%. Seeds are kept in airtight glass jars and an "iron reserve" is kept in hermetically sealed small metal boxes. The size of stored samples varies according to the accession from 0.5 g to 400 g.

The oldest seeds in our storage date back to 1982. The oldest samples in storage and the accessions of which the amount of seeds is too small are regenerated. Regeneration of tomato accessions is performed each year for 50-100 accessions. Solanaceae accessions are not safety-duplicated so far.

Characterization and evaluation

Characterization and evaluation have been made for 885 accessions (817 tomato, 65 pepper and 3 husk tomato) (Table 1). They are carried out in working collections. A working collection of field tomato is maintained each year, in which accessions are multiplied and evaluated (accessions collected during collecting missions or accessions held in the genebank storage which require regeneration of seeds).

Characterization and evaluation are carried out according to IPGRI descriptor lists including morphological characters, agronomic traits, disease resistance, reaction to stress conditions, etc.

For tomato each year 49 traits (10 traits for the plant and 32 for the fruit) are evaluated in field trials in two or three replicates, each of 20 to 25 plants. Observations were made for 26 tomato accessions in 2003 and for 35 tomato accessions in 2004.

Data regarding characterization and evaluation are given in Table 1.

The list of traits which are recorded each year since 1987 is given below. Observations are conducted according to Esquinas-Alcázar (1981).

Tomato descriptors

PL	Accession number	W 8_15	Blossom end shape
NAZ	Name	W 8_19	Easiness of stem removal
W 4_1	Anthocyanin colouration of hypocotyl	W 5_8	Presence of jointless pedicel
W 4_2	Growth	W 5_9	Ribbing at calyx end
W 7_11	Plant size at flowering	W 5_12	Radial cracking
W 7_2	Stem type	W 5_13	Concentric cracking
W 4_3	Style pubescence	W 5_14	Fruit fasciation
W 7_6	Leaf attitude	W 5_11	Firmness
W 7_7	Leaf type	W 5_7	Transverse section
W 7_12	Foliage cover	W 5_4	Skin colour, ripe fruit
W 7_9	Inflorescence type	W 5_5	Interior flesh colour
W 7_10	Flower fasciation	W 5_6	Interior flesh colour intensity
W 5_1	Size of fruit	W 8_7	Number of locules
W 5_2	Predominant shape	W 8_8	Thickness of pericarp
W 8_3	Secondary shape	W 8_9	Size of core
W 8_2	Size variability	W 8_17	Puffiness
W 5_3	Exterior colour of immature fruit	W 8_21	Blossom end rot
W 8_4	Intensity of greenback	W 6_1	Type of maturity
W 8_6	Exterior colour	W 6_2	Ripening uniformity
W 8_11	Pedicel area	W 10_2_9	Phytophthora infestans
W 8_12	Size of pedicel scar	W 10_4_3	Tobacco mosaic strain 0
W 8_13	Size of corky area around pedicel scar	W 10_4_4	Tobacco mosaic strain 1
W 8_14	Shape of pistil scar	Cetkowatość	Bacterial spot
W 5_10	Blossom end; scar size	Year	Year of evaluation
W 8_16	Blossom end scar condition		

Characterization of pepper includes 28 traits. As an example the list of observations made on pepper accessions in 1998 is given below (descriptors used by breeders).

Pepper descriptors

1	No of Gene Bank	15	Fruit surface
2	Accession Name	16	Fruit uniformity (scale 1-9)
3	Beginning of flowering	17	Fruit wall thickness
4	Beginning of fruit forming	18	Fruit weight [g]
5	Beginning of consumption ripening	19	Range of fruit length from to [cm]
6	Beginning of physiological ripening	20	Range of fruit width from to [cm]
7	Plant height [cm]	21	Total fruits [g]
8	Plant growth habit	22	Total number of fruits
9	Type of branching	23	Small fruits [g]
10	Fruit size	24	Number of small fruits
11	Colour of consumption ripened fruit	25	Not well-shaped fruits [g]
12	Colour of physiological ripened fruit	26	Number of not well-shaped fruits
13	Fruit shape	27	Total sugar content [%]
14	Fruit shape at blossom end	28	Fruit dry matter [%]

Documentation

Passport data for all accessions agree with FAO/IPGRI *Multi-crop Passport Descriptors* and FAO WIEWS Descriptors. Characterization and evaluation data for tomato are stored in a computerized database. Some of the characterization data for pepper are computerized. Images of tomato (including whole fruit and vertical and horizontal section of fruits) are stored in jpeg format.

Availability of germplasm

Most accessions are freely available upon request if there are enough seeds. For ex-directory breeding material, written permission from the donor breeder is necessary. Information is provided upon request, as email attachment, on CD-ROM or floppy discs.

Collecting expeditions

Collecting expeditions in different regions of Poland and neighbouring countries to collect local forms and wild relatives are organized each year. In 2003 four missions were organized in Poland and Romania, resulting in a total of 178 collected accessions including 12 landraces of tomato and 9 of pepper. The main sources of new germplasm are home gardens and traditional small farms in which the farmers have grown different types of vegetables, often over a long time, for domestic use. Each collected seed sample is split in two parts: one part is added to the base collection, the other is used for regeneration and preliminary evaluation.

Utilization of germplasm

Accessions collected in the genebank are used in various research programmes carried out at the universities, institutes, breeding companies (in resistance breeding to *Phytophthora infestans,* bacterial spot, cytological studies concerned with resistance to *Oidium lycopersici*). The results of these studies are provided to the genebank, enriching the existing database.

The PGR Laboratory cooperates with breeding companies and agricultural universities which have research or breeding programmes and experts in plant species of interest. Cooperation covers regeneration of seeds, maintenance of field collections, evaluation of

morphological and marketable characters, resistance to pathogens, etc. Materials from the genebank are used in creative breeding programmes.

On-farm conservation has been carried out for two years in five organic farms in the southern part of Poland. The aim is to maintain tomato and other vegetables landraces in their "mother locality" and to reintroduce landraces from the genebank to their places of origin. At the same time the local traditional ways of using these vegetables as food, folk medicine, etc. are recorded. The plots are used for demonstration and popularization of local landraces to children in schools (i.e. green school), to the local population, etc.

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Status of the Solanaceae collection at the Research Institute for Vegetable and Flower Gardening, Vidra, Romania[12]

Niculai Popandron

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The Research Institute for Vegetable and Flower Gardening in Vidra holds collections of eggplant, pepper and tomato.

The eggplant collection contains cultivars, local lines and also accessions of the wild species *S. sisymbrifolium* and *S. torvum*, for a total of 50 accessions.

The tomato collection holds about 90 accessions.

Staff involved in the breeding programmes include one breeder for eggplant, three breeders for pepper and one breeder for tomato.

Regeneration of the material is done at a 4-year interval.

The genetic resources are characterized for morphological and agronomical traits. For the cultivars, UPOV descriptors are used.

Passport data and characterization data are recorded in writing and need to be computerized.

The seeds are stored at room temperature. The storage room temperature and humidity are not controlled.

The Research Institute for Vegetable and Flower Gardening in Vidra is not the only institute in Romania holding germplasm. The Suceava Genebank for example holds collections of *Capsicum*.

The Institute in Vidra would like to be involved in EU GENRES projects as well as in projects for collecting genetic resources in Romania.

12 *Summarized by M.C. Daunay and W. van Dooijeweert*

Solanaceae genetic resources activities in Turkey

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Introduction

Plant genetic resources activities of Turkey, carried out by the Aegean Agricultural Research Institute (AARI) in Izmir, started in 1964. These studies were implemented within the framework of the National Plant Genetic Resources/Diversity Research Programme (NPGRP) in 1976. AARI has taken overall responsibility at national level as the project centre. Cooperation with various institutions is negotiated according to the principles of the Regulation on Collection, Conservation and Utilisation of Plant Genetic Resources issued in 1992. All joint programmes are conducted on a project basis within agreements.

Turkey is also a member of several international programmes working on plant genetic resources, such as the Plant Genetic Resources Commission of the Food and Agriculture Organization of the United Nations (FAO). Turkey has adhered to the undertaking of Plant Genetic Resources, the European Cooperative Programme for Crop Genetic Resources Networks (ECP/GR), the West Asia-North Africa Plant Genetic Resources Network (WANANET) of the International Plant Genetic Resources Institute (IPGRI), the World Wheat Genetic Resources Networks and the World *Beta* Network (WBN).

Ex situ *conservation*

Seed materials are stored in controlled conditions in the genebank at AARI. The national genebank has long- and medium-term storage facilities for base and active collections and short-term storage facilities for working samples of breeding programmes.

Table 1. Conservation facilities in the cold stores of AARI's genebank

	Short-term storage	Medium-term storage	Long-term storage
Temperature (°C)	+4	0	-20
Moisture content (%)	6-8	6-8	6
Container type	LAP	ASCN	ASCN
Viability monitoring	-	5-year intervals	10-year intervals

LAP: aluminium laminated foil bags; ASCN: aluminium sealed can containers

The Solanaceae collections

Turkey is not a primary centre of origin of Solanaceae, but many landraces and old varieties of Solanaceae are still grown by farmers in almost all regions owing to their high level of adaptability and good quality. However the landraces have recently started to be replaced rapidly by commercial varieties because of developments in the seed and seedling sectors. In addition to systematically planned annual collection missions, expeditions are planned to the areas where rapid changes in the cultivars/landraces used have been observed.

The Solanaceae collections of Turkey consist of eggplant, pepper and tomato landraces and old varieties, and some species mainly used as medicinal plants (*Physalis* spp., *Datura* spp., *Hyoscyamus* spp., *Atropa* spp.). The collections contain different types of local races' populations and have great value owing to their useful character. A total of 1944 accessions of Solanaceae species are maintained in the National Genebank of AARI.

Table 2. *Ex situ* Solanaceae collections at AARI (1964-2003)

Crop	Botanic name	No. of collecting sites	No. of accessions
Eggplant	*Solanum melongena*	49	219
Pepper	*Capsicum annuum*	65	976
	Capsicum annuum grossum	6	12
	Capsicum annuum longum	4	10
	Capsicum frutescens	13	40
Tomato	*Lycopersicon esculentum*	62	646
	Physalis	1	1
Others	*Datura, Hyoscyamus, Atropa* spp.	13	40
Total			**1944**

Multiplication and regeneration

Stored accessions with low germination rate or a small amount of seed in active collections and insufficient collection material are put into the multiplication and regeneration programmes.

Solanaceae species are assumed to be outcrossing to some extent, therefore distance isolation and/or isolation in cages are used during the multiplication and regeneration of accessions.

Characterization

The characterization of Solanaceae collection was started in 2004, using the IPGRI and UPOV descriptor lists. A total of 232 accessions have been characterized, including 75 of eggplant, 82 of pepper and 75 of tomato. The number of traits characterized is 20, 40 and 38 for eggplant, pepper and tomato respectively. Characterization of solanaceous crops will continue in future years.

Utilization

Breeding programmes on eggplant, pepper and tomato are carried out by conventional methods. Turkish Solanaceae collections are intensively used in breeding programmes. Nine varieties were released and registered by the AARI vegetable breeding group (two of eggplant, six of pepper and one of tomato). In the next few years the Solanaceae collection will be utilized in the F1 Hybrid Project.

APPENDICES

Appendix I. Current status of seed stock management in different countries

(updated June 2005)

Country	Institute	Medium-term storage (working collection)	Long-term storage (base collection)	Endangered accessions / reasons	Regeneration frequency	Safety-duplication arranged	Offering to host under black box agreement
Armenia		room temperature		yes / old, few seeds	frequent (1-3-5-7 years depending on age and amount of seeds)	planned with CGN, the Netherlands	no
Austria	Governmental genebanks		desiccation -20°C glass flasks	no	when germination rate < 60%	not yet; an arrangement is planned with CGN, the Netherlands	no
	Arche Noah (NGO)	desiccation air-tight glass flasks	desiccation -15°C	no	no	no	no
Bulgaria	IPGR Sadovo	+6°C no limit	-18°C 5000 seeds	yes / seed quantity	depending on germination ability	no	no
Czech Republic	RICP Genebank Olomouc		-18°C 50 g	no	15 years	yes, in Slovakia	no
France	INRA Montfavet	4°C 30-40% RH >1000 seeds		yes / many	13-20 years	ongoing	no
Germany	IPK Genebank Gatersleben		-15°C 15-30 g	no	15-20 years	500 Solanaceae accessions	yes (depending on capacity)
Georgia	Institute of Farming Mtskheta Tserovani	4°C seeds in jars				no	no
Greece	ARCMT Thermi Thessaloniki	0-5°C 30% RH 5000 seeds		yes / old, few seeds	15 years		
Hungary	ABI Tápiószele	0°C 10-20 g	-20°C 10-20 g		when germination rate < 80% of the initial rate	yes, in national base collection	yes, limited space
Israel	Volcani Center Bet Dagan		-10°C	yes (no regeneration)	no regeneration		
	Hebrew University Jerusalem		seeds stored at University of California, Davis (USA)	no			
Italy	IDG Bari		-20°C 1-10 g	few accessions / old, few seeds	not pre-fixed	no	no

Country	Institute	Medium-term storage (working collection)	Long-term storage (base collection)	Endangered accessions / reasons	Regeneration frequency	Safety-duplication arranged	Offering to host under black box agreement
The Netherlands	CGN Wageningen	desiccation 4°C 35 seeds pre-packed	-20°C 1000 seeds (if regeneration)	no	depending on seed viability	yes, at HRI, United Kingdom	yes
	Botanical Garden Nijmegen	2-4°C silica gel 2500 seeds		few accessions / old, few seeds	5-10 years		
Nordic countries	The Nordic Gene Bank (NGB)	-20°C	-20°C	no	when germination rate is lower than 65% or minimum of 1000 seeds	a safety collection at Svalbard Norway	yes possible to store material as a safety collection at Svalbard Norway
Poland	National Centre for Plant Genetic Resources, IHAR Radzików	0°C	-18°C	no	variable according to age and amount of seed		
Portugal	BPGV Braga	0-5°C 40-50% RH	-20°C no humidity control	no	last regeneration in 2000	no	yes
	EAN Oeiras	(48 acc.) +4°C aluminium foil packets under vacuum		no	last regeneration in 1990 there are approximately 500 seeds / accession	no	no
	"		(3 acc.) -16°C no humidity control	very few seeds	seeds were collected in 1982 and were never regenerated	no	no
Romania	Research Institute for Vegetables and Flowers, Vidra	room temperature 5-20 g			when germination <50%	no	no
Russian Federation	VIR St. Petersburg	10-15°C 10-14% RH 5-15 g	+4°C 6-9% RH 10-15 g	yes / old, few, germination	working collection 3-10 years base collection 25 years	yes	no
Serbia and Montenegro	Centre for Vegetable Crops Smederevska Palanka	8°C 5-20 g		yes / few, germination	10 years		
Slovak Republic	RIPP Genebank Piešťany	+5°C desiccation ≥1000 seeds	-18°C desiccation ≥1000 seeds	no	depending on the seed viability, monitoring each 5 years, when viability under standard	yes in Genebank Prague, Czech Republic 500 seeds	no

Country	Institute	Medium-term storage (working collection)	Long-term storage (base collection)	Endangered accessions / reasons	Regeneration frequency	Safety-duplication arranged	Offering to host under black box agreement
Spain	Institute for the Conservation and Improvement of the Agrodiversity, Polytechnic University of Valencia	3°C desiccation with silica gel 5-6% RH (200-5000 seeds)		no	depending on the viability	almost all the collection is duplicated in: - Centre for Genetic Resources, Alcalá de Henares (Madrid) - Vegetables Genebank, (Zaragoza)	no
Turkey	AARI Izmir	desiccation 0°C for active collection and +4°C for working samples of breeders	desiccation -18°C	no	depending on viability and number of seeds	at CRIFC in Ankara	no
Ukraine	Institute of Vegetables and Melon Crops Selektsijne		-18°C				
United Kingdom	University of Birmingham	transferred to Montfavet and Nijmegen		yes / many			

Appendix II. Standardized minimum protocol for seed regeneration and seed storage of Solanaceae

This protocol gives general guidelines for successful seed regeneration and seed storage. Environmental conditions and available equipment can vary according to the partner.

1. Disinfection of seeds

1.1. If seed disinfection is carried out at the time of seed extraction, after seed cleaning, put the soaked seeds in a solution of sodium hypochlorite (NaClO) at 1.2 chlorometric degrees during 30 minutes; then rinse carefully and dry. However, it is possible that this method negatively affects the seeds' longevity. Commercial bleach is available at various concentrations, expressed as "chlorometric degrees". Example: for a commercial bleach at 48 chlorometric degree, dilute it 1/40 (1 volume for 39 volumes of water) and you obtain a solution at 1.2 chlorometric degrees.

1.2. If seed disinfection is carried out just before sowing, several methods are possible:

- For any crop, bleach can be used against fungal, bacterial and viral contaminations. Seeds are soaked in a solution of NaClO at 6 chlorometric degrees, applied for 15 minutes, then carefully rinsed and sown.
- For pepper, disinfection against TMV can be done in a 10% solution of sodium triphosphate (Na_3PO_4). Seeds are soaked in this solution (15 minutes to one hour maximum) and then thoroughly rinsed with (tap) water. Seeds must be sown immediately afterwards.
- For tomato, disinfection against TMV can also be done with thermotherapy. Seeds are maintained at 80°C for 24 hours after which they can be germinated. This treatment must not be applied to very freshly harvested seeds, but only on seeds aged at least 2 months (well dried).
- Fungicides with the active compound "mancozeb" (e.g. Titane 445) can be used against fungal diseases. It is important to sow immediately after disinfection.

2. Identification

Plants must be well labelled with a unique number during the regeneration procedures to prevent mix-up of accessions. From sowing until harvest the same number will be used for one accession. This can be a field number or better, the accession number.

3. Number of plants regenerated

3.1. For self-pollinating species use at least 5 plants. For heterogeneous accessions or cross-pollinating species at least 10 plants should be used to ensure the preservation of the genetic diversity. If possible use more plants.

3.2. Try to regenerate as few times as possible because every time a heterogeneous accession or a population is regenerated, an involuntary selection is made, which causes loss of genetic diversity. If seeds are processed and stored under optimum conditions (long-term storage), regeneration cycles can be minimized.

4. Transplanting seedlings

From the seedlings, the requested number of plants for regeneration must be picked without making a selection, except:

- Seedlings that are not vigorous enough to grow and reproduce can be skipped.
- The very vigorous seedlings in self-pollinating species can be hybrids, so it is better to reject them.

5. Isolation

Though cultivated Solanaceae are considered as self-pollinating species, in some climatic conditions they can display a variable spontaneous outcrossing rate, due to insect activity. This is in particular the case of eggplant, pepper, *Physalis* and *Cyphomandra*.

5.1. For self-pollinating species, to prevent accidental outcrossing, each accession must be isolated. This can be done by keeping accessions in an insect-free greenhouse, by isolating accessions with gauze nets, or by bagging the flowers. Better seed set can be obtained by vibrating the flowers or by hand-pollination.

5.2. For cross-pollinating species such as some wild relatives of cultivated Solanaceae, geographical isolation is possible. An indication of the minimum distance between two accessions is 1 km, depending on the local conditions (climate, topography, insect population, etc.). Cross-pollinating species grown in isolated greenhouses can be pollinated by hand with a mixture of pollen from all plants of that accession.

6. Harvest

6.1. To be sure each plant of a given accession contributes equally to the seed harvest, on average an equal number of comparable fruits per plant must be harvested.

6.2. To get a good seed lot with high germinability it is recommended to harvest only healthy fruits from healthy plants.

6.3. To get a good seed lot with high germinability it is recommended to harvest fully ripe but not over-ripe fruits. Indeed, it is possible that seeds start germinating already in the fruit when it is over-ripe.

6.4. Harvest as many seeds as possible because this means that seed regeneration is needed less frequently.

7. Seed cleaning

Seeds can be cleaned in different ways depending on the species and on local facilities.

Example: Water method. Cut the fruits and remove the seeds by squashing the fruits in a bowl, or by using a spoon. Add a surplus of water and mix well. Add and pour off the water and fruit pulp several times. The pulp and empty seeds will float. The good seeds sink to the bottom.

A variant of this method can be used for tomato, the seeds of which are coated with gel; instead of water, one can use a solution of HCl at 2% added to the pulp, then well mixed together and then left for one hour. Rinse carefully.

8. Desiccation

8.1. Seeds are dried as quickly as possible. Spread the seeds as much as possible and try to have an air current for rapid drying. If seeds are dried outside, always put them in the shade. Very high temperatures can affect the germination rate of the seeds. Never use temperatures higher than room temperatures.

8.2. After a first drying, the seeds can be packed in paper bags for further drying with silica gel or in an air-conditioned room.

8.3. The best way to store seeds is in airtight containers under cool conditions. Frozen seeds will keep their germinability even longer. If seeds are frozen they must first be well dried. A seed moisture content between 4%-7% is good; 6% can be reached for eggplant, pepper and tomato by drying outside when the relative humidity is 30%.

9. Storage

9.1. Well dried samples can be stored in sealed plastic or aluminium foil bags or in sealed tins or glass jars. In this way seeds will keep their germinability for a long time. Caution: storage in paper bags at ambient temperatures may cause rapid loss of germinability. If the moisture content of the seed is not easy to establish before storage, the use of a small packet of silica gel in the airtight container can ensure that the seed is sufficiently dry.

9.2. The best storage temperatures for long-term storage are -15°C to -20°C and for medium-term storage +4°C to +5°C.

9.3. Always have a safety-duplicate of each accession stored under good conditions in another place.

Appendix III. ECP/GR Working Group on Solanaceae – Progress report for the period 2003-2006

(document produced after the ECP/GR Network Coordinating Groups Meeting held in Bonn 29-31 March 2006)

I. RESULTS			
a. Comparison of workplan (milestones) versus results obtained			
Workplan (milestones)	***What results have been obtained?***	***Which aims/goals have not been (fully) reached?***	***Completeness ratio (%)***
Establishment of databases	- Eggplant database available on-line	- Some countries have not provided their passport data yet	100%
	- Pepper inventory made and partly available	- Transfer to AARI, Turkey in June 2006 but some countries have not provided their data	100%
	- Tomato inventory made	- Some countries have not provided their passport data yet	25%
	- *Physalis* and *Cyphomandra* available on-line	- Some countries have not provided their passport data yet	100%
Fill in the DB with members' files	- Eggplant	- Files acquired but not uploaded yet, and some countries have not provided their passport data yet	25% of files included
	- Pepper	- Idem	13% of files included
	- Tomato	- No files uploaded in a centralized DB structure	45% of files acquired
	- *Physalis*	- New members lists not acquired yet	90%
	- *Cyphomandra*	- Idem	90%
Discussion forum for database managers	Available on-line through http://www.vir.nw.ru/forum/	Make that forum active and promote the use of this forum	80%
Identification of duplicates in the collections		Got second priority because databases must be ready first	0%
Improve safety-duplication	Percentage of safety-duplication determined and hosts identified	Some collections are not yet safety-duplicated	50%
Production of a harmonized protocol for regeneration	Protocol agreed by the WG	Not yet available on the WG Web site	90%

I. RESULTS

a. Comparison of workplan (milestones) versus results obtained

Workplan (milestones)	***What results have been obtained?***	***Which aims/goals have not been (fully) reached?***	***Completeness ratio (%)***
Development of minimum descriptors lists	- Eggplant: agreed	- Not yet available on the WG Web site	100%
	- Pepper: agreed	- Not yet available on the WG Web site	100%
	- Tomato: agreed	- Not yet available on the WG Web site	100%
		- *Physalis* (second draft made)	50%
		- *Cyphomandra* (first draft made)	25%
Identification of Web sites for correct taxonomic names	List available on the WG Web site	Change incorrect taxonomic names in the databases, check species identity	50%

b. Contribution to the four ECP/GR priorities for Phase VII

1. Characterization/evaluation (including modern technologies)

Minimum descriptors are developed by different WG partners and can be used by all WG partners. In future these primary characterization data can be merged in the CCDB.

2. Task sharing

Four partners of the WG developed and/or are hosting CCDBs.
For regeneration, accessions from some individual collections are regenerated by seed companies.
Partners who want to host black boxes for safety-duplication are identified.
Different partners developed collegially a minimum descriptor list for a specific crop.

3.* In situ*/on-farm conservation and development

Not discussed. Worth the effort to develop in the future.

4. Documentation and information

Development of CCDB per crop. Some ready, some available on the ECP/GR Web site in a few months. Complementation with missing data.

c. Relevance (regional / international)

Did your work and/or outputs have inter-regional dimension? (if it did, give precise details)

Development of CCDB enables the comparison of accessions available in databases outside Europe. In future this can be used to optimize the collections held over the world by gaps analysis and rationalization.
Taxonomy used by other collection holders in the world can be compared, and the right nomenclature used. Taxonomist are identified for questions.

d. Lessons learnt (recommendations)

Which lessons learnt are also relevant for other Working Groups?

ECP/GR is a good platform to initiate cooperation, also for cooperation in new projects such as EU projects.

II. ANALYSIS	
a. Bottlenecks	
What were the bottlenecks experienced?	*How do you plan to solve the bottlenecks?*
1a. WG members of a given country change from one ECP/GR meeting to the next	Ask ECP/GR to ask countries to designate stable members: members must be assigned for a long period by their country
1b.WG members do not always represent their country adequately but only their institute or even not that	Ask ECP/GR to ask countries to designate relevant members, who know enough about the country's GR
1c. WG members are not always aware of technical aspects of the crops the Solanaceae WG deals with	Members should really be involved in genetic resources , and know about biological aspects of the crops involved in the Network
1d. Some WG members who in the last few years attended the meetings did not always help in moving forward	WG members should be responsive to the requests of Chairperson and Vice-Chairperson of the Solanaceae WG
2. Time and money are always the bottlenecks to getting things done	Maybe a new mode of information and sharing and using the available ECP/GR money for WGs
b. Internal support needed (Secretariat, Steering Committee, other Working Groups, etc.)	
Support for finalizing the last WG meeting report (Bari, 2004) Working Groups which have already started in tracing duplicates could help in getting us started Support and advices from the Documentation and Information Network, for DB topics	
c. External resources needed (collaboration, external funding)	
Money from EU projects or other international projects	

III. PLANS	
a. Planned activities	*b. Expected results*
1. Produce the report of the 2004 meeting (Bari, Italy)	Make the information available to all members and the worldwide GR community
2. Complete the existing DBs with missing passport data, and put the Tomato DB on-line	For all crops covered by the network, have searchable databases for passport data
3. Promote the use of the proper nomenclature by all members	To have relevant information in the DBs for the species nomenclature
4. Make the minimum list of descriptors available on the ECP GR Web site, and promote its use by the partners for feeding the DBs	Complete the DBs with primary descriptors data
5. Improve the level of safety-duplication of all members' germplasm	Material stored under long term conditions for all members
7. Start identification of duplicates within and between collections	Better structured databases and development of a tool for collection holders to improve their collection management

Appendix IV. Acronyms and abbreviations

AAA	Armenian Agricultural Academy
AARI	Aegean Agricultural Research Institute, Izmir, Turkey
ABI	Institute for Agrobotany, Tápiószele, Hungary
AEGIS	A European Genebank Integrated System
ARCMT	Agricultural Research Center of Macedonia and Thrace, Thermi-Thessaloniki, Greece
AVRDC	Asian Vegetable Research and Development Center, Taipei, Taiwan,
BAZ	Bundesanstalt für Züchtungsforchung und Kulturpflanzen (Federal Centre for Breeding Research on Cultivated Plants), Germany
BPGV	Banco Português de Germoplasma Vegetal, Braga, Portugal
CAC	Central Asia and Trans-Caucasus
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza (Center for Tropical Agricultural Research and Education), Turrialba, Costa Rica
CCDB	Central crop database
CGN	Centre for Genetic Resources, Wageningen, The Netherlands
COMAV	Centro de Conservación y Mejora de la Agrodiversidad Valenciana, Universidad Politecnica de Valencia (Center for the Conservation and Breeding of the Agricultural Biodiversity, Polytechnic University of Valencia), Spain
EAN	Estação Agronómica Nacional (National Agronomic Station), Oeiras, Portugal
ECP/GR	European Cooperative Programme for Crop Genetic Resources Networks
ENITHP	Ecole Nationale d'Ingénieurs des Travaux de l'Horticulture et du Paysage, Angers, France
EPDB	European Pepper Database
EU	European Union
EURISCO	European Internet Search Catalogue (EPGRIS project)
FAO	Food and Agriculture Organization of the United Nations, Italy
HBLVA	Höhere Bundeslehr- und Versuchsanstalt für Gartenbau, Wien-Schönbrunn, Austria
HRI	Horticulture Research International, Wellesbourne, United Kingdom *(now Warwick HRI, Warwick University)*
IB	Institute of Botany, Yerevan, Armenia
IBPGR	International Board for Plant Genetic Resources *(now IPGRI)*
IGV-CNR	Istituto di Genetica Vegetale-Consiglio Nazionale delle Ricerche (Institute of Plant Genetics of the National Research Council), Italy
IHAR	Plant Breeding and Acclimatization Institute, Radzików, Poland
INRA	Institut national de la recherche agronomique, France
IPGR	Institute for Plant Genetic Resources, Sadovo, Bulgaria
IPGRI	International Plant Genetic Resources Institute, Rome, Italy
IPK	Institut für Pflanzengenetik und Kulturpflanzenforschung (Institute for Genetics and Plant Breeding), Gatersleben, Germany *(now Leibnitz-Institut für Pflanzengenetik und Kulturpflanzenforschung = Leibnitz Institute of Plant Genetics and Crop Plant Research)*
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture

MCPD	Multi-crop Passport Descriptors (FAO/IPGRI)
NGB	Nordic Gene Bank, Alnarp, Sweden
NGO	Non-governmental organization
PGR	Plant genetic resources
RICP	Research Institute of Crop Production, Prague, Czech Republic
RIPP	Research Institute of Plant Production, Piešťany, Slovak Republic
RIVC	Research Institute of Vegetable Crops, Skierniewice, Poland
SCVIC	Scientific Center of Vegetable and Industrial Crops, Armenia
TMV	Tobacco mosaic virus
UPOV	Union internationale pour la protection des obtentions végétales (International Union for the Protection of New Varieties of Plants), Geneva, Switzerland
UPV	Universidad Politécnica de Valencia (Polytechnic University of Valencia), Spain
USDA/ARS	United States Department of Agriculture/Agricultural Research Service
VEGMAP	Vegetables, Medicinal and Aromatic Plants Network (ECP/GR)
VIR	N.I. Vavilov Research Institute of Plant Industry, St. Petersburg, Russian Federation
WIEWS	World Information and Early Warning System (FAO)

Appendix V. Agenda

Ad hoc *Meeting of the ECP/GR Working Group on Solanaceae*
17 September 2004, Bari, Italy

8:30	**Introduction** - Opening remarks - Presentation of the Agenda and adjustments - Self-introduction of new participants
9:00	**Establishment of Central Databases** - Introductory remarks - *Physalis* and *Cyphomandra* databases: achievements (*J. Prohens*) - Pepper database: achievements (*L. Aykas*)
10:15	*Tea and coffee break*
10:45	**Establishment of Central Databases (cont.)** - Tomato database: achievements (*A. Omelchenko*) - Eggplant database: achievements (*G. van der Weerden*)
12:30	**Safety-duplication of each collection under long-term conservation conditions** (current level, what is safety-duplicated and where, which holding has long-term facilities, who is willing to host "black boxes")
13:00	*Lunch*
14:00	**Visit to the genebank**
15:00 (parallel sessions)	**Discussion about future developments for each database** (*DB managers only*) **Regeneration and storage guidelines**
15:30	*Tea and coffee break*
16:00	**Solanaceae GR in Georgia** (*G. Aleksidze*) **and Romania** (*N. Popandron*)
17:00	Establishment of minimum primary descriptor lists for eggplant, pepper, tomato, *Physalis* and *Cyphomandra*
18:00	**Secondary characterization**
18:10	**Taxonomy (**identifying taxonomists, searching useful Web sites)
18:20	**EU GENRES project**
18:30	**Concluding remarks**

Appendix VI. List of Participants

Ad hoc *Meeting of the ECP/GR Working Group on Solanaceae 17 September 2004, Bari, Italy*

N.B. The composition of the Working Groups is subject to changes. The latest update for the Solanaceae Working Group can be found on the Web page (http://www.ipgri.cgiar.org/networks/ecpgr/Contacts/ecpgr_wgsol.asp).

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