ECP/GR *In situ* and On-farm Conservation Network

Report of a joint meeting of a Task Force on Wild Species Conservation in Genetic Reserves and a Task Force on On-farm Conservation and Management

18-20 May 2000 - Isola Polvese, Italy

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Introduction

Welcoming address

On behalf of the University of Perugia and the Province of Perugia, Prof. Valeria Negri welcomed all participants to the first joint meeting of the ECP/GR Task Forces on *In situ* and On-farm Conservation.[1] The location of the meeting was the island of Polvese, in the middle of Lake Trasimeno and within a natural park devoted to the protection of the biodiversity of Lake Trasimeno and its surroundings. On this site, the Province of Perugia manages a scientific and educational park with activities mostly addressed to young people. Five years ago this administration funded a project aimed at safeguarding germplasm threatened with extinction around the Trasimeno Lake area. The project's outputs were a documented germplasm collection, as well as an increase in acreage cultivated with landraces of a local species of cowpea. This project was successful in promoting and achieving effective conservation of crop genetic resources on-farm.

The island of Polvese is pleasant, peaceful and inviting to meditation. Prof. Negri expressed her wishes that the location and the environment of the meeting be conducive to fruitful discussions and to a positive start of the Task Forces' work. She wished that the meeting conclude with concrete proposals and recommendations for effective cooperation for the safeguarding of these precious biological and cultural resources 'received on loan from our children' (as a native American chief said).

Introduction to the ECP/GR In situ *and On-farm Conservation Network*

In a short introduction, L. Maggioni (ECP/GR Coordinator) welcomed all the participants and explained the current structure and mode of operation of the ECP/GR Programme. The framework of the *In situ* and On-farm Conservation Network was established by the ECP/GR Steering Committee in 1995. However, only in 1998 were specific funds allocated to organize a meeting of two small task forces (*ad hoc* coordinating groups) with precise objectives and workplans. The ECP/GR Secretariat established the two groups of experts on the basis of suggestions received from the ECP/GR National Coordinators and organized a joint meeting at the island of Polvese, taking into consideration the recommendation of the European Symposium on the implementation of the Global Plan of Action (GPA) in Europe (Braunschweig, Germany, 1998), that two separate but allied groups be formed. Invitations were extended to a representative of the European NGOs nominated by the NGO meeting held at Ryton Gardens, UK, in June 1999. Representatives from EuroMAB, DIVERSITAS and EUFORGEN were also invited to join, as well as additional resource persons Prof. Massimo Angelini, University of Genova and Prof. Valeria Negri, University of Perugia.

A number of recommendations made by the European Symposium in Braunschweig offered a list of tasks for priority action, and these were suggested for initial collaborative action in the preparatory process leading to this meeting. L. Maggioni wished to clarify that the Task Forces' members are expected to offer their expertise and to represent the interests of the European region as a whole, independently from their respective nationalities. He suggested that the Task Forces could be flexible entities, appropriately shaped to address specific tasks in the future. Coopting additional experts could therefore be an effective way to expand the level of activity within the Network. He also noted that the feasibility of any action plan arising from the present meeting should be compatible with the existing resources, namely the inputs in kind that the Task Forces' members and other experts will be able to offer, together with the funds that governments will likely

devote to *in situ* conservation as part of their national plans. To raise additional funds, project proposals will have to be submitted to appropriate agencies. Small technical meetings and other actions may also be funded by the ECP/GR Programme during Phase VI, upon the submission of proposals to the Steering Committee.

Finally, the ECP/GR Coordinator expressed his best wishes for a fruitful meeting and its expected achievements, including the collation of existing information on ongoing *in situ* activities in Europe, progress on the elaboration of draft project proposals, the identification of a Task Force workplan, and the agreement for strengthened collaboration with NGOs, EuroMAB and other entities involved in *in situ* conservation of crop landraces and their wild relatives.

Introduction to the participants

The participants (see list in Appendix I) briefly introduced themselves and their respective institutes or organizations and explained their interest in this meeting and the main outcomes expected.

Agreement on agenda, terms of reference of the Task Forces and goal and purpose of the Network

On behalf of the ECP/GR Secretariat, Brigitte Laliberté presented the revised agenda for the meeting, which was approved by the Group. The terms of reference of the Task Forces and the logframe of the Network were also approved (see Appendix II).

Presentations

This section summarizes presentations made by the participants either during the plenary sessions or in the respective Task Forces' sessions. Relevant points that called for further discussions are summarized in Part II of this report.

IPGRI's activities in in situ *and on-farm conservation*

Devra Jarvis

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IPGRI's *in situ* conservation activities can be characterized as a continuum of approaches and taxa. Activities fall within the three overlapping headings of Wild Relatives in Natural Ecosystems, Crop Varieties in Farmers' Fields, and Home Gardens. Projects are structured to research plant genetic resource conservation in the ecosystems to which they are adapted, whether natural ecosystems, agroecosystems, or the interface between the two. A selection of IPGRI *in situ* and on-farm conservation projects, investigating wild relatives, introgression between cultivated species and their wild relatives, and on-farm, home garden, and total agroecosystem conservation, is presented in Table 1. More information regarding *in situ* conservation of wild relatives, introgression, and on-farm conservation can be found at the following IPGRI Web site:
<http://www.ipgri.cgiar.org/themes/in_situ_project/home/insituhome.htm>.

The implementation of *in situ* conservation in agroecosystems requires that key research questions be answered and strong institutional frameworks created.

I. What information is necessary?

- The amount and distribution of genetic diversity maintained by farmers over time and space
- The processes used to maintain genetic diversity on-farm
- The people who maintain genetic diversity on-farm: men, women, old, young, rich, poor, certain ethnic groups, others
- The factors that influence farmers' decision-making to maintain diversity: variety choice, management practices

II. What partnerships are needed?

- Linking disciplines and sectors
  - Linking disciplines and institutes (formal and informal)
  - Building rapport with farmers
  - Ensuring equity in participation and decision-making

- Stakeholders involved
  - Ministries of Agriculture and of Environment
  - Agricultural Research Institutes
  - Universities
  - Extension workers
  - NGOs
  - Farmers (including male and female motivators)

Table 1. Selected IPGRI *in situ* and on-farm conservation projects

Project	Institute(s)	Country(ies)	Crop(s)
Natural ecosystems			
Wild relatives			
Information systems	IPGRI, UNEP/GEF	Armenia, Sri Lanka, Madagascar, Bolivia, Uzbekistan	crop wild relatives
Inventory of crop wild relatives and GIS	IPGRI	Paraguay	crop wild relatives
Inventory of crop wild relatives and GIS	IPGRI	Sichuan	crop wild relatives
Inventory of crop wild relatives and GIS	IPGRI	Bolivia	crop wild relatives
Interface between natural systems and agroecosystems			
Introgression (crop cultivars and their wild relatives) and farmer selection of new genotypes			
Introgression and farmer selection of sorghum	IPGRI	Uganda	wild and cultivated sorghum
Introgression and farmer selection of chili	IPGRI	Mexico	wild and cultivated chili
Introgression and farmer selection of *Phaseolus*	IPGRI	Guatemala	wild and cultivated *Phaseolus*
Agroecosystems			
Home gardens			
Home gardens	IPGRI	Guatemala, Cuba, Venezuela, Ghana, Vietnam	
On-farm conservation			
Strengthening the scientific basis of *in situ* conservation of agricultural biodiversity	IPGRI	Burkina Faso, Ethiopia, Hungary, Mexico, Morocco, Nepal, Peru, Turkey, Vietnam	21 cultivated crops
Buckwheat in China and Nepal	IPGRI	Nepal, China	buckwheat
Tarogen	IPGRI	Pacific island countries	taro
Conservation in desert-prone areas of Africa	FAO, IPGRI, IFAD	Mali, Zimbabwe	sorghum, pearl millet, bambara groundnut, cowpea
Date palm project	IPGRI, UNDP/GEF	Morocco Tunisia, Algeria	date palm
Domestication and farmer improvement of yam in West Africa	IPGRI, IITA	Benin	yam
Participatory monitoring of genetic erosion	IPGRI	Ghana, Uganda, Malawi	bambara groundnut, yam, cassava, sweet potato
INIBAP *in situ* conservation of banana	IPGRI/INIBAP	Uganda, Tanzania	banana
Capacity-building, national programme conservation	IPGRI, UNDP/GEF	Armenia	

In the IPGRI Global On-Farm Conservation Project entitled: "Strengthening the scientific basis of *in situ* conservation on-farm," different partners are studying:

1. The social, economic, cultural and environmental/biological factors that influence farmers' choices for varieties they will plant.
2. The effect of farmer management of agromorphological characters, the plant population structure and breeding systems, the agroecosystem and the seed exchange

and storage system for these varieties.
3. How to link disciplines and create representative partnerships.
4. Options for enhancing the benefits of local crop diversity to farmers.

In April 2000, the partners of the IPGRI Global Project met in Morocco to plan for the next three years of the project using the goal-oriented logical framework analysis method. From this method, the partners revised and refined the project's goal, purpose, outputs and major activities as follows.

Overall goal
The *in situ* conservation and utilization of crop genetic diversity are ensured for sustainable agricultural development, food security and ecosystem health.

Project purpose
The scientific basis, institutional linkages and policies that support the role of farmers in conservation and use of crop genetic diversity are strengthened.

Project outputs
1. Methods for and examples of comparative analysis across crops that integrate data in key processes from different disciplines and countries are developed and promoted. *(Note: the original output was a scientific basis for* in situ *conservation on-farm, but the partners felt that within the 3-year funding period of the project this longer-term output would not yet be obtained).*
2. Principles, options and approaches to integrate agrobiodiversity in agricultural development are made available to project partners and other stakeholders.
3. National organizations are supported in the development of *in situ* conservation programmes and policies through increased scientific capacities and representative partnerships.

Project activities (organized by outputs)

1.1 Standardize methods and tools for data collection
1.2 Develop a database system for cross-national analysis and data transfer
1.3 Determine across the project the relationships between farmer names for varieties and genetic distinctiveness
1.4 Assemble data on processes affecting genetic diversity in chosen crops and sites
1.5 Identify key factors that determine the maintenance of genetic diversity
1.6 Develop examples of determining the appropriate spatial and temporal scales for crop genetic diversity conservation
1.7 Agree on questions that the multiple country analysis will address
1.8 Evaluate data in hand to identify gaps in data needed to answer multiple country analysis questions
1.9 Set up an international network of persons from national, regional and global levels to be responsible for data integration from country components
1.10 Assemble and analyze integrated data from country components
1.11 Develop mechanisms for reporting, publishing and exploiting the results of analyses

2.1 Devise "channels" to communicate agrobiodiversity information to public, extension and education programmes and policy-makers
2.2 Adapt participatory and empowering methodologies for on-farm PGR management
2.3 Document case studies to show the emphasis of using agrobiodiversity for

agricultural development
2.4 Document case studies to show adding-value options
2.5 Develop the understanding of national and international legal and economic policies related to agricultural biodiversity

3.1 Support training programmes where the gaps are identified
3.2 Publish and distribute training materials on *in situ* conservation for research and extension workers
3.3 Support scholarships for advanced degree training on *in situ* conservation of agricultural biodiversity
3.4 Provide access to expertise on thematic issues
3.5 Facilitate exchange of experiences and scientific meetings at global level
3.6 Organize thematic coordination and transfer of research results among national groups
3.7 Develop ways to present scientific findings to different user groups
3.8 Synthesize experiences on interdisciplinary farmer-scientist partnerships to build models for collaboration
3.9 Facilitate recognition of interdisciplinary and farmer participatory research on *in situ* conservation
3.10 Provide incentives for efforts to increase gender equity and farmer representation.

A summary of examples of the possible benefits of on-farm conservation of crop diversity for farmer households (*private good*) and for society (*public good*) is presented in Table 2.

Table 2. Potential public and private benefits of on-farm conservation

	Economic and sociocultural benefits	Ecological benefits	Genetic benefits
Farmer household (*private good*)	• manage risk and uncertainty • fit different budget constraints • avoid or minimize labour bottlenecks • manage pest and diseases • fulfil rituals or forge social ties	• reduction of chemical pollution • soil amelioration, nitrogen fixation • pest control	• insurance against environmental and social and economic change
Society (*public good*)	• food security • empowerment of local communities • social sustainability • improved nutrition	• reduction of chemical pollution	• future insurance against environmental change, disease and pests • use for the agricultural industry

Many options are being tried within the IPGRI Global *In Situ* Conservation On-Farm Project to increase the benefits to farmers of conserving crop genetic resources. These options include those that improve the plant genetic resources themselves and those that increase the demand for the material such as:

- Participatory plant breeding for adaptiveness, pathogen resistance, cultural uses, etc.
- Improved access and awareness through seed networks, community genebanks, diversity fairs
- Better processing, marketing, consumer awareness

- Policy incentives
- Education in the formal sector, curriculum development at primary, secondary and graduate levels
- Strengthening grassroot institutions.

UNEP/GEF Project in Armenia on wild relatives conservation

Jozef Turok

IPGRI Regional Office for Europe, Rome, Italy

Armenia hosts a unique diversity of plants, especially crop wild relatives. Although reserves were established to protect target genetic resources, many of them remain threatened, particularly in mountain areas. The national biodiversity strategic action plan recognizes major needs and objectives in the area of plant genetic conservation. The tasks of two recent PDF-B phase projects funded by the Global Environment Facility (GEF) were briefly presented: "Agrobiodiversity Conservation in Armenia" and "*In situ* Conservation of Crop Wild Relatives through Enhanced Information Management and Field Application". The latter is a global effort involving Armenia (from Europe) as one of the five countries participating.

Discussion on the concept and definition of on-farm management of PGRFA

Bert Visser

Centre for Genetic Resources, The Netherlands (CGN), Plant Research International, Wageningen, The Netherlands

The presentation of Bert Visser is reported here. The concepts expressed below generated a lively discussion. Points of agreement are summarized in Part II.

Concept

Why on-farm management of PGRFA?

- **Strengths**
  - Coverage of diversity
  - Adaptive capability
  - Linkage to local knowledge
  - Maintaining a full system
- **Weaknesses**
  - Sustained maintenance?
  - Limited access to original material
  - Limited documentation
  - Limited knowledge of mechanisms

When on-farm management of PGRFA?

- Genetic erosion on-farm

By whom on-farm management of PGRFA?

- Farmers
- Organic farming
- Hobbyists / self-suppliers
- NGOs
- Formal sector (supportive)

Definition

On-farm management of PGRFA concerns the conservation and continuous development of crop genetic diversity, through exchange, selection, breeding and storage, as part of and for the purpose of crop production, under the agroecological conditions available to farmers and self-suppliers.

Purpose in Europe

- To conserve cultural landscapes (traditional crops, forages)
- To conserve traditional diversity (fruit trees, underutilized and neglected crops)
- To maintain crop diversity originating in Europe (vegetables, herbs, cereals)
- To maintain diversity not covered by the formal sector (organic farming sector)
- On-farm conservation should include in-garden conservation

Mechanisms

- Farmers and hobbyists serving specific markets (traditional, regional, organic)
- Self-suppliers serving their own needs
- NGOs directly collaborating and providing services to farmers and hobbyists / self-suppliers
- Formal sector (breeding institutes, genebanks, universities) in a supportive role

Incentives

- Access to markets

- No discrimination against traditional diversity by seed regulations
- No DUS/novelty requirements
- No financial barriers to marketing
- Supportive subsidy mechanisms

Conclusions

- Genebanks carry out *ex situ* conservation, but can only support on-farm management of PGRFA
- No sustainable on-farm conservation without utilization
- No conservation of genotypes but of crop diversity in general.

Reports of activities carried out before the meeting from both Task Forces

Genetic reserve conservation of PGRFA in Europe

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Introduction

To avoid confusion it is important to place genetic reserve conservation of wild plant genetic resources for food and agriculture (PGRFA) in the broader context of *in situ* conservation as a whole. The Convention on Biological Diversity (CBD) in its definition of *in situ* conservation incorporates two distinct conservation techniques, i.e. the conservation of wild or cultivated species:

> "*In situ conservation* means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties."
>
> *Article 2 (CBD 1992)*

Maxted *et al.* (1997a) proposed that *in situ* conservation be viewed as a general strategy which involved the conservation of genetic diversity where it is currently found, as opposed to *ex situ* conservation, where germplasm is moved away from the original location where it is found to a second, often distant location for long-term conservation. Maxted *et al.* (1997a) considered that the *in situ* strategy was composed of two distinct conservation techniques and proposed the following working definitions for these two techniques:

> *Genetic reserve conservation* - the location, management and monitoring of genetic diversity in natural wild populations within defined areas designated for active, long-term conservation.
>
> *On-farm conservation* - the sustainable management of genetic diversity of locally developed traditional crop varieties with associated wild and weedy species or forms by farmers within traditional agricultural, horticultural or agri-silvicultural cultivation systems.

This report will therefore focus on current efforts to conserve the plant genetic resources in Europe in genetic reserves.

To avoid further confusion it is necessary to more precisely distinguish between what has been referred to by Maxted *et al.* (1997b) as active and passive *in situ* conservation. Plant species are undoubtedly conserved in numerous European environments unlikely to be considered genetic reserves, such as areas of wasteland, field margins, primary forest and even national parks, but in each of these cases the existence of any particular species is coincidental, therefore passive and not the result of active conservation management by humankind for that particular species. These passively conserved populations are not actively monitored and, as such, are more vulnerable to extinction, i.e. any deleterious environmental trend leading to population depletion would be unlikely to be noted and therefore counter-management measures would not be adopted. In this sense, active conservation requires positive action to promote the sustainability of the target taxa and the maintenance of the natural or artificial (e.g. agricultural) ecosystems which contain

them, thereby implying the need for associated habitat management and monitoring. Thus in this report the review is restricted to active conservation of PGRFA in *in situ* genetic reserves in Europe. Although applying this strict definition of genetic reserve conservation does seriously limit the number of projects or activities that can be included in the review, it is necessary to ensure that a realistic view is obtained and efforts can be focused to rectify the unsatisfactory position.

European conservationists can learn a lot about the establishment, management and monitoring of genetic reserves from activities in neighbouring countries. Turkey, Israel and the countries of the Fertile Crescent (Lebanon, Syria, Jordan and Palestine) all have active genetic reserve conservation programmes. Perhaps the first genetic reserve was established at Ammiad in Israel and the workings of this reserve or area for genetic study have been reviewed by Anikster *et al.* (1997). The Ammiad reserve was established to conserve wild wheat and barley diversity; however, populations are not managed and monitored in the strict sense. The Global Environment Facility (GEF) funded the establishment of three genetic reserves in Kaz Dag area of northwestern Aegean Region, Ceylanpinar of southeastern Turkey and the Amanos region of southern Turkey in 1993 (see Ertug Firat and Tan 1997 and Kaya *et al.* 1998) for the conservation of broader woody and non-woody crop relatives in an integrated multi-species project. More recently in 1999 another GEF project was initiated in four countries of the Fertile Crescent (Lebanon, Syria, Jordan and Palestine) (Maxted *et al.* 2000). Like the Turkish project before it, this project also has the objective of conserving *in situ* in genetic reserves woody and non-woody PGRFA. Thus far, sites have been selected and monitoring of target populations has begun. This project will provide an invaluable resource for the conservation and sustainable utilization of PGRFA because of its location at the heart of so much genetic diversity of our major crop species.

To attempt to find European examples of genetic reserve conservation programmes, 18 national PGR representatives were contacted and each asked to provide information on the species conserved in their reserves. The information required was:

1. Species conserved
2. Location of reserve (including latitude, longitude and altitude)
3. Land area (actual size in hectares)
4. Land ownership (e.g. private, public, other)
5. Name of organization managing the site
6. Type of management interventions
7. Type of monitoring interventions
8. Type of financial support (e.g. none, public, private)
9. Reason for establishing the reserve at that location
10. Involvement of local people in conservation project
11. Current users of the reserve
12. Access policy for the reserve, either in terms of public access or users' access to the conserved PGRFA
13. Linkage to *ex situ* conservation
14. Listing of key people/organizations involved in the genetic reserve project.

Eight countries responded and interestingly none provided complete answers for a reserve. The national responses are briefly summarized below (countries are listed in alphabetical order).

Belgium

A fruit tree conservation network has been established in the Walloon region and the network now has approximately 2600 accessions of apple, pear and plum conserved.

Germany
Examples are restricted to inventorying existing PGRFA found in conservation areas, such as:

- *Humulus lupulus* L., *Valerianella locusta* (L.) Laterr., *Carum carvi* L. in Northrhine-Westfalia, Germany
- *Beta vulgaris* subsp. *maritima* Arcang. on the coast of the Baltic Sea
- *Beta vulgaris* on the coasts of the North Atlantic and Mediterranean
- *Vitis vinifera* var. *silvestris* on the islands in the upper Rhine
- Forest species are actively conserved throughout federal Germany.

Greece
The need to establish genetic reserves of PGRFA was realized in 1990, but lack of funds has inhibited practical activities; however, 12 sites have been identified which would be suitable once funding becomes available.

Israel
The Ammiad reserve was perhaps the first explicitly established to conserve genetic diversity of PGRFA, in this case wild wheat, in Europe. The project is managed by the Israeli Gene Bank, but receives little financial support from the government.

The Netherlands
A project was established in January 2000 to conserve the genetic diversity of pasture grasses, but currently the project is restricted to inventorying ancient grassland.

Poland
There are 19 national parks and numerous other protected areas, but there are no active conservation projects of PGRFA in *in situ* genetic reserves. There is national legislation to protect 28 PGRFA species and there is a project to place location information on endangered plant species in a database. Any *in situ* conservation work associated with PGRFA has focused on the conservation of fruit trees.

Spain
Numerous *in situ* conservation projects exist but it is uncertain whether any can be regarded as active conservation of PGRFA in *in situ* genetic reserves.

United Kingdom
The European Common Catalogue has led to the cessation of cultivation of all landraces of PGRFA in the UK and there are no genetic reserves for the conservation of PGRFA species. However, the Henry Doubleday Research Association (HDRA) is the largest organic gardening association in Europe with over 27 000 members. HDRA operates the Heritage Seed Library and 'Adopt-A-Veg' campaign, which actively lobbies and promotes the conservation of vegetable diversity.

Thus it can be seen that the *in situ* conservation picture for Europe remains sketchy and, if taken at face value, does not provide a satisfactory complement to *ex situ* techniques. It is obvious from the response that there are few active genetic reserve projects in Europe and *in situ* conservation in genetic reserves in Europe remains clearly in its infancy. It is recommended that a further, more thorough investigation be undertaken.

There are, however, also institutional problems facing genetic reserve conservation. Possibly the current situation in the UK may be unfortunately mirrored elsewhere in Europe. Interest in the *in situ* conservation of PGRFA in the UK began in the mid-1980s but expanded greatly following the United Nations Conference on the Environment and Development (UNCED) in 1992 and the ratification and implementation of the CBD in the UK in 1993. However, within the UK, conservation falls between two ministries,

Agriculture and Environment (in many other European countries a distinct Ministry of Forestry may also be involved). To date the UK Ministry of Agriculture, Fisheries and Food has played an active role in the *ex situ* conservation of PGRFA, but regards *in situ* conservation as beyond its remit. The UK Ministry of Agriculture regards *in situ* conservation as being in the domain of the Ministry of Environment, Transport and the Regions. However, the latter ministry shows no interest in PGRFA species conservation and is certainly not interested in genetic conservation *per se*; they focus their conservation activities entirely on habitat and wild species. As a result of this unfortunate lack of a holistic governmental approach to plant conservation, the *in situ* conservation of PGRFA in the UK falls between two ministries and continues to be inadequately resourced.

It might be hoped that this unfortunate situation is not reflected in other European countries, but discussion with European colleagues confirms that this situation is duplicated elsewhere. The first meeting of the ECP/GR *In Situ* and On-farm Conservation Network gives the participants the opportunity to voice serious concerns over the lack of *in situ* conservation coverage of PGRFA in Europe, a point that needs to stressed both to the European Union as well as to individual sovereign states until the situation is rectified.

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A first inventory of on-farm conservation and management activities in Europe including examples of formal and informal sector cooperation

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Introduction

The great changes introduced into agricultural systems after World War II acted as a powerful leveller and changed the way food was produced and exchanged. As a result, landraces have disappeared from most sites in Europe and genetic erosion is still in progress.

This paper represents an effort to acknowledge different on-farm conservation and management activities in Europe, to identify gaps and opportunities for future work in this area. Its purpose is also to circulate the information. Annex 1 provides summary information on some examples from selected countries in Europe. A list of contacts (NGOs and institutions) has been initiated and will be completed to produce a directory of organizations/individuals involved in on-farm conservation and management activities in Europe. The directory will be produced in electronic and printed form in spring 2001 and will be available from the ECP/GR Web site and printed copies from the Secretariat.

Therefore this inventory is not to be considered as complete because of fragmentation of activities, different sectors (formal and informal) involved and lack of time which made it impossible to reach all people involved at this initial stage. The relative weight given to individual countries is mainly dependent on the information available and may not reflect the intensity of on-farm activities in the respective countries. The inventory has been carried out through the ECP/GR National Coordinators and focal persons, the ECP/GR *In situ* and On-farm Conservation Network Task Force members, NGOs, associations and various institutions that are involved in on-farm management of plant genetic resources in the different countries. They were asked to compile a questionnaire and/or to give any information or contact persons that could be useful for the inventory. A diversity of approaches was used to evaluate which one would be most successful. Therefore the information collected is also diverse and is intended to standardize the collected information and complement it through a more in-depth survey during 2001. We thank all those who, in different ways, contributed to this paper.

No activities have been reported or information received from Albania, Armenia, Azerbaijan, Belarus, Estonia, France, Iceland, Latvia, Lithuania, Poland, Russian Federation and Turkey. Only details of contacts or a very brief summary have been reported from Albania, Austria, Bulgaria, Croatia, Cyprus, Czech Republic, Israel, Hungary, Portugal, Slovakia and F.R. Yugoslavia. Contacts and summary information have been reported from Belgium, Denmark, Finland, Georgia, Germany, Greece, Italy, Malta, Moldova, Norway, Romania, Slovenia, Spain, Sweden, Switzerland, Ukraine and United Kingdom.

Several of the focal points in countries not formally participating in ECP/GR welcomed ECP/GR's attention to *in situ* and on-farm conservation of PGRFA and welcomed future cooperation. There is a necessity for training NGOs in this area, as recommended during the Braunschweig Symposium, especially in the NIS countries.

Implementation of national plans for on-farm conservation

Several initiatives have been started in the direction to implement national strategies and plans of action for the conservation and management of landraces and traditional varieties. For example, the Department of Agriculture in Norway is currently working on a national plan for the conservation of plant genetic resources, to be ready this year. On-farm management will be discussed as one possible method of conserving genetic diversity in crop plants. The Plant Production Inspection Centre, Seed Testing Department in Finland, carried out a project in 1997-99 for a system of characterization, registration and on-farm maintenance of landraces and old cultivars of cereals and forage grasses and legumes (Onnela 1999a). This maintenance and support system will be implemented soon, and farmers will be able to apply for support for their on-farm management activities. In Greece, the Ministry of Agriculture has identified a broader number of sites cultivating traditional varieties through surveys of its central and peripheral services and proposals by various scientific groups, farmers' associations, NGOs for environmental protection and ecological farming. The compilation of this work has been used to submit a major proposal for support of the traditional agriculture and maintenance of biodiversity. The proposal includes a provision for a specific national plan for on-farm conservation.

Diverse patterns of on-farm conservation and management

There is a great diversity found in the European continent in terms of pedoclimatic conditions, agricultural practices, cultural heritage due to history, languages, religions and traditions, and socioeconomic conditions. This has led to diversity in patterns of on-farm conservation activities mainly with regard to species maintained, persons and institutions involved, reasons for maintaining species on-farm, location and acreage of on-farm conservation, and the type of support for carrying out work.

Species conserved and managed on-farm

Some countries surveyed have already undertaken national surveys to find out more about what activities are going on in this field, the species of landraces and traditional varieties, and the acreage managed on-farm. For example, Hungary does not have a formal network for the on-farm conservation of some of these resources but has undertaken a survey of what is being grown and conserved. A similar situation has been reported for Denmark, Malta and Moldova. In Malta, a survey has been carried out to identify old varieties of fruit trees, namely citrus, vines and stone fruits. A number of old traditional varieties have been identified from different fruit tree orchards and private home gardens. Work is still carried out on this aspect. In Moldova, the Centre for Plant Genetic Resources, founded in 1999, initiated the stocktaking of local varieties of crops and their description. The local varieties from different ecological regions of the country have been collected as an initial step. The following crops have been given a priority: varieties of *Zea mays*, *Phaseolus vulgaris*, *Cicer arietinum*, a number of fruit crops and vines, Cucurbitaceae, vegetables and aromatic crops. Generally, these varieties are grown on marginal land by rural populations. The population continues to cultivate these crops mainly for the following reasons:

- Cultural food traditions (e.g. *Phaseolus vulgaris*)
- Preferences of plant species and specimens resistant to limiting ecological factors (e.g. many local maize varieties are more resistant to drought than hybrids)
- Genetic diversity of amateur varieties of some vegetables and melons and gourds is much higher than the commercial varieties and hybrids
- Religious reasons (growing of *Ocimum basilicum*).

In gathering information for this paper, Spain provided some very useful information on species cultivated, landraces, the type of management and support for the conservation and management of the landraces, and collected information on the main reasons for maintaining on-farm.

Recently the Finnish NGOs have organized regional inventory projects of old landraces and cultivars. In 1999 the association Northern Heritage started an apple project in Northern Savolax area. The project succeeded to find several hundred local apple trees, of which the best were chosen to be tested in local nurseries.

Some constraints in undertaking such surveys have been mentioned, however, such as the increasing amount of land privatization and the fact that farmers can change their priority in terms of use of different crops. This can result in rapid loss of local varieties. Other general constraints are related to the general lack of financial support to undertake these activities such as the lack of material for collecting missions and visits to farmers.

Table 1 reports groups of species, landraces and old cultivars in existence in different countries. This information, gathered through the different surveys, strictly refers to landraces and old cultivars still cultivated and not to living collections, educational and research activities or private nursery activities. It is important to acknowledge that a more extensive investigation is needed to complete this list. This list is intended to show the diversity that still exists in Europe. For example, landraces and old cultivars of cereals are still cultivated in almost all of the European countries surveyed.

In the case of fruit trees and grapevines, it is not always easy to understand to what extent particular varieties in certain areas are still grown on-farm as part of and for the purpose of crop production. All the contributors indicated the existence of living collections, material saved or exchanged from germplasm banks in public institutions, administrations, educational bodies and private organizations, associations and individual farmers and nurseries. As mentioned previously, a list of contact persons will be compiled as a directory.

Table 1. Landraces and old cultivars managed on-farm in different European countries, according to the preliminary survey (note: the information reported in this table only provides an indication of the material conserved on farms and is not a complete inventory)

Countries	Cereals	Vegetables	Pulses	Forages	Industrial	Medicinal	Fruits/vines
Belgium	–	–	–	–	–	X	X
Czech Republic	–	–	–	X	–	–	–
Denmark	–	–	–	–	–	–	X
Finland	X	X	X	X	–	–	X
Germany	X	–	–	–	–	–	–
Georgia	X	–	X	–	–	–	–
Greece	X	X	X	–	–	X	–
Hungary	X	X	X	X	–	–	–
Italy	X	X	X	X	–	X	X
Moldova	X	X	X	–	–	X	X
Malta	–	–	–	–	–	–	X
Norway	–	–	–	X	–	X	X
Poland	X	X	X	X	–	–	X
Romania	X	X	X	X	X	X	–
Slovakia	–	X	–	–	–	X	–
Spain	X	X	X	–	–	–	X
Sweden	–	–	–	–	–	–	X
Switzerland	X	–	–	–	–	–	X
The Netherlands	X	X	–	–	–	–	–
Ukraine	X	X	X	X	–	X	–

Areas where landraces survived

Traditional agriculture did not survive in major agricultural regions where modern cultivars have been introduced in large areas. The spreading of these modern varieties has caused the loss of landraces, particularly in the eastern countries, where the past collectivization policy is considered to have been the major factor responsible, but also in

western countries. The majority of landraces and old cultivars of crops are generally found in underdeveloped and marginal areas where old farmers still cultivate them on limited acreage, for home consumption and for local markets. It is also in these regions that the genetic erosion is more and more evident. Nevertheless in some cases, for particular products or species specific to a certain market, some of the most productive land is used for the cultivation of these landraces on large areas.

Cooperation between the formal and informal sectors

Both the formal and informal sectors are involved in on-farm conservation activities. However, the informal sector plays, in general, a more predominant role. According to most country reports, the most active organizations at the national level are mostly NGOs, especially in northern countries. Some reports even put in evidence the lack of interest of the formal sector in on-farm conservation activities. As for informal sector involvement, amateurs and foundations are the most acknowledged type of people/institutions involved.

Table 2. Some examples of NGOs active in on-farm conservation and management in Europe

Countries	NGOs	Description
Austria	Arche Noah	A very active NGO (Arche Noah) is working on conservation and development of crop biodiversity. About 800 traditional cultivars are grown each year and demonstrated to the interested public. The species include cereals, fibre crops, vegetables and pharmaceutical crops.
Denmark	Center for biodiversitetet (Centre for Biodiversity) and Frosamlerne (The Seed Collectors)	300 members of these organizations work mainly with vegetables, fruits like *Ribes*, *Fragaria*, *Malus*, *Prunus*, but also with old varieties of cereals. The crops are mainly grown by private individuals using organic or biodynamic methods. The members look for old PGR material with specific characteristics, collect information about the history of the varieties and undertake evaluations of quality characteristics, resistance and storage ability.
Finland	Maatiainen ("landrace" in Finnish)	Maatiainen, established in 1989, is a voluntary NGO, active in conservation of plant genetic resources. The members work mainly on amateur basis. They search for and collect seed, and grow the landraces and old varieties, mainly of ornamental plant species, in their private gardens or field plots. The seeds are exchanged and sold among the network of seed savers. The newest seed catalogue of Maatiainen includes a total of 543 accessions of traditional ornamental and cultivated plant varieties.
Georgia	DIKA, Renovabis and Elkana	The Agrobiodiversity Protection Society Dika has undertaken on-farm conservation since 1998. The society rescued and propagated in farmers' fields several species and varieties under threat in the collection of the Institute of Botany. About 300 such forms are preserved. Dika also has been involved in a project funded by Renovabis, a German organization, which aims at maintaining and reviving Georgia's agrobiodiversity. During the last 3 years, a number of local varieties have been reintroduced on farms. Other conservation activities ongoing in Georgia are being conducted by other NGOs including the Biological Farming Association Elkana, initiated in 1996.

Countries	NGOs	Description
Germany	VERN, Dreschflegel, Eichstetter Saatgutinitiative	A complete inventory of German NGOs, including contact persons and activities in plant genetic resources, can be found at <http://www.dainet.e/genres/pgr/ngo.htm>. VERN (Verein zur Erhaltung und Rekultivierung von Nutzpflanzen in Brandenburg e.V.), was founded in 1993 by interested farmers and gardeners to use large nature-protected areas in northeastern Germany for dynamic management of the old cultivars of genebanks. The regional network takes care of about 500 samples of grain crops (half of them regional landraces), about 100 samples from other agricultural crops, 70 cultivars of potato, several hundred cultivars of vegetables and about 300 cultivars of tomatoes. Dreschflegel is an informal association of 8 farmers and gardeners maintaining and improving several 100 cultivars of mainly vegetables. A community in South Germany, the Eichstetter Saatgutinitiative has initiated the growing of traditional cultivars of vegetables, fruit and vines. Traditional knowledge is recorded and production of traditional cultivars by local farmers is promoted.
Sweden	Sesam Association	Sesam is a non-profit-making association devoted to conservation of cultivars. The members work mainly with vegetables but also with agricultural plants, fruits, berries and herbs. The highest priority is given to Swedish (and Nordic) landraces, second highest to commercial varieties developed in Sweden or with a long tradition of use. The association also has quite a lot of varieties from other parts of the world. Growing and reproduction of cultivars are done on a voluntary basis in private gardens or small farms. Sesam cooperates among others with the Nordic Gene Bank and some open-air museums.
Switzerland	Pro Specie Rara	Pro Specie Rara is a foundation working since 1982 to promote the conservation and use of genetic resources both in plants and animals. In plants, more than 1000 volunteer "seed savers" are coordinated by a few paid professionals. There are about 60 orchards with more than 1000 fruit cultivars in total. Crop-specific groups are working on potatoes, tomatoes, grain crops and leguminoseae. The majority of individuals are interested in genetic variation, cultural diversity and history. Farmers who have to cover their income from selling agricultural products seem to be a minority.
United Kingdom	Henry Doubleday Research Association (HDRA) and its Heritage Seed Library (HSL)	HDRA is an international NGO concerned with researching, demonstrating and promoting organic gardening, farming and food. For the past 20 years it has been campaigning on issues affecting plant genetic resources for food and agriculture, and is actively involved in the conservation of traditional vegetable varieties suitable for gardeners, through the work of its Heritage Seed Library (HSL), which is unique in the UK. The HSL currently contains over 700 varieties covering all the main sorts of vegetables. Seeds kept in the library can be broadly categorized as follows: commercial varieties that may no longer be sold, heirloom and historical seeds.

A good example of cooperation between formal and informal sector is the case of the Walloon Region in Belgium. In response to the public concern and the need to preserve fruit germplasm, the Department of Biological Control and Plant Genetic Resources, Centre for Agronomic Research of the Ministry of Agriculture (DBCPGR), has developed since 1994 an on-farm orchard network with other public and private partners (public administrations, environment protection associations and NGOs). The network has for objectives to collect and characterize (both from a biological and a cultural point of view), and to safeguard on-farm. The purposes are didactic and pedagogic, as well as fruit production and processing and landscape restoration. Local people are therefore directly involved in these activities. The partners are committed through an agreement with the DBCPGR, which allows it to access the plant material. The partners are responsible for

maintaining the orchards in good conditions for a certain period and are supported through technical assistance.

Another example of cooperation among the formal sector and farmers is in Italy, in the Tuscany Region, where a group of 32 "conservator farmers" were supported financially for producing vegetable seeds, coming from the 10 years of collecting work of the Florence University of Agriculture and the conservation activities of the Germplasm bank of Lucca Botanical Garden. ARSIA (Agenzia Regionale per lo Sviluppo e l'Innovazione nel Settore Agricolo, a regional institution) is the coordinator of such programme with the double aim to preserve local varieties in the original collecting place and to reintroduce this material into cultivation. The Dipartimento di Biologia Vegetale e Biotecnologie Agroambientali, of Perugia University, also cooperates with several local institutions (Provincia di Perugia, Abruzzo Regional Institution for Agricultural Development, Lazio Region) and individual farmers, farmers' organizations and private associations of central Italy for on-farm conservation of landraces and the development of economies based on their cultivation (Negri *et al.* 2000; Silveri *et al.* 2000).

In Georgia the Academy of Sciences cooperates with the Agrobiodiversity Protection Society 'Dika' and with the German organization 'Renovabis' to preserve, recover and introduce endemic cultivated plant species and local varieties, to propagate information on agrobiodiversity conservation and utilization, and to train the personnel needed for carrying out the above-mentioned activities.

Reasons to maintain and conserve on-farm

On-farm conservation can be undertaken for a diversity of reasons, sometimes a mixture of all of them. The main reasons reported were for domestic consumption, for personal reasons (hobby), for commercialization of the final products (mostly at local level), or because it is promoted by local and national authorities for conservation purposes and for research studies.

The first two reasons, for home consumption and as a hobby, are probably the least acknowledged and documented. However, they are probably the most substantial both in terms of number of species and of acreage. Many landraces are maintained by farmers in relatively large areas such as in the case of 'Grindstad' timothy in Norway, of emmer in the Garfagnana valley in Italy, or lentil in Colmenar Oreja in Spain. However, most farmers are probably cultivating landraces on a smaller scale and still maintain their seed. When exploration work aimed at finding landraces in Central Italy started 10 years ago, those landraces were considered extinct everywhere. Nevertheless in about 10 years of work over 300 landraces of different crops (cereals, vegetables, pulses, fruits and aromatics) were collected in Central Italy. It is therefore likely that in regions similar to Central Italy, landraces are still being maintained to a greater extent than is believed.

When landraces are maintained for home consumption the following reasons are reported: traditional reasons (recipes peculiar to an area, links to certain rituals or religious practices) and better quality (Greece, Italy, Malta, Romania, Spain), better adaptability to local pedoclimatic constraints (Finland, Georgia, Greece, Italy, Norway, Romania). The cultivation of local varieties for local markets is also mainly linked to the reasons reported above. The niche products are strictly connected to a specific market demand at a local level, especially, but not only, in southern countries. The return of traditional taste and curious varieties tends to stimulate the return of previously abandoned germplasm both in the home gardens and on farms. In Italy some landraces are niche products which, being highly appreciated, have a greater value on the local markets (Falcinelli and Negri 1998). Landraces are also often reported to be used in organic and biodynamic agriculture (Belgium, Denmark, Finland, Italy, and Spain); organic farmers often look for landraces or old cultivars for seeding their fields.

The conservation of fruit trees deserves specific attention. Many educational activities and reintroduction activities carried out both by the formal and informal sectors are

reported by several countries on this group of species (Belgium, Denmark, Finland, Georgia, Italy, Spain, Sweden). The use of old varieties of fruit trees is also mentioned for landscape restoration in Belgium. Also on-farm conservation of fruit species is in some cases clearly market-oriented. The selling of fruits of peculiar varieties or derived products (juice, cider) is reported in some countries (Belgium, Italy, Malta and Spain). The activity of a number of nurseries in collecting, propagating and selling old varieties of fruit trees for home gardens was indicated in Italy. It should be noted that while this activity certainly contributes to the safeguarding of germplasm, it is somehow disengaged/unlinked with the ethnic and social substrate which created landraces. In catalogues, old varieties from different areas are reported but little information is given on their traditional uses. Also the customers are most likely to buy according to names and fruit appearance or ripening dates rather than to their links with their territory.

Constraints to the use of landraces for food production

There are social, economic and political reasons that limit the use of landraces in crop production. Some of those are farmers' age, farmers' awareness of landraces' importance, legislation coming into force and the lack of incentives for farmers.

Landraces are mostly grown by old farmers; few of the young people, who are often not able to appreciate their biological and cultural importance, stay in the field of agricultural production. This makes it difficult to continue their cultivation if not to increase it, which is important for plant genetic resources conservation. A greater problem related to maintaining diversity on-farm in countries of the North is to maintain the people in agriculture. This is mainly a political problem.

Another limitation to a more extensive use of landraces is represented by farmers' perception that modern cultivars are better producers (reported in some contributions from Slovenia, Greece, Italy). This is probably true, at least under certain agricultural systems. The raising of farmers' awareness of particular landraces seems a priority action to be carried out for on-farm conservation. It is also important to note that a restricted number of farmers and farmers' associations, aware of the use of local landraces because they are involved in on-farm conservation, are alone without any coordination and possibility of comparison of their work/activities.

Present legislation also limits landrace maintenance on farms. Commercialization of landrace seed is discouraged by intellectual property rights on varieties and by the need to meet the International Union for the Protection of New Varieties of Plants (UPOV) standards (especially considering uniformity) to obtain the status of variety. The reception and application by state members of Directive 98/95/CE of the Council of European Communities of 14 December 1998 may solve problems related to landrace seed commercialization in the EU. Nevertheless, after reception, its implementation would require a list (Register) of existing landraces, to be compiled after an extensive regional survey to investigate and evaluate the situation. Such Register would first of all acknowledge the existence of autochthonous material belonging to different agricultural areas which are particular for biodiversity and local knowledge, traditions and history of inhabitants, and secondly offer a basis for taking appropriate safeguarding measures.

On this topic it is worth mentioning the proposal recently developed in Finland for a system of characterization, registration and on-farm maintenance of landraces and old cultivars of cereals and forage grasses and legumes (Onnela 1999a, 1999b). The first step of the system is research based on the guidelines of the UPOV (however without the need to meet the strict requirements of uniformity and stability) aimed at describing the characteristics of landraces and old cultivars and at determining whether their morphological and phenological characteristics can be distinguished from those of other varieties. Following completion of this research, distinct landraces and old cultivars may be registered and maintenance contracts can then be drawn up. Such contracts could constitute a special form of environmental support in the new agri-environmental programme (2000-2006) implemented in Finland according to European Council

regulation No. 2078/92. When preparing contracts for subsidized maintenance of registered landraces, the farms where the landraces in question have been cultivated for decades are prioritized. In the case of registered old cultivars, breeders would primarily maintain cultivars, although they may forward this task to farmers. Within the system, the KTTK (Finnish Production Inspection Centre) Seed Testing Department would act as the registering authority, and would be responsible for varietal research, registration, contracts, maintaining the official contract list, and following up maintenance work. The maintenance and support system described above will be implemented soon, and farmers may apply for support for their on-farm management work. Before the support can be paid, the landraces and varieties have to be characterized and if proved unique, registered as mentioned earlier. The system proposal considered also the possibilities for marketing of registered and maintained landrace seed, which means alterations in the current seed marketing legislation. According to the amendments of EU seed directives concerning marketing of seed of 'conservation varieties', the updating work of Finnish seed legislation is now under way.

In the EU, another constraint to the use of landraces is the present regime of incentives for farmers. For example, in the case of durum wheat, the EU allows contribution to farmers only if they use certified seeds. Under the present situation, landrace seeds cannot be certified. This sometime leads to paradoxical situations. For example in Sicily, farmers growing 'Timilia' landrace of durum wheat, selected and maintained by their own family for centuries, are disadvantaged twice: first because 'Timilia' is less productive and second because they have no access to subsidies.

Support for on-farm conservation activities

Educational and research activities are mostly funded by governments and local authorities. On-farm conservation is also, to a certain degree, promoted by the public. We have already presented the Finnish proposal; in Italy some Regions allow contributions for increasing acreage managed under landraces (in the framework of 2078 regulation and of its own financial budgetary disposability), but no extensive survey of landraces/old cultivars still in existence has been undertaken additionally to this preliminary survey.

Since only *in situ* conservation can safeguard genetic resources, maintaining their ability to evolve in the face of biotic and abiotic pressures and social and cultural changes and to meet the needs of unpredictable future demands, effective incentives have to be offered to farmers to maintain their landraces. How best this can be done is presently under discussion since the simple payment of "guardian farmers" by the community does not necessarily address the future or create long-term incentives for conservation (Orlowe and Brush 1996; Zeven 1996).

Research needs

To conclude this overview about on-farm conservation and management, several fields of research were suggested, such as:

- Exploration (leading to thorough regional inventories) and characterization work on landraces and old cultivars cultivated on-farm
- Evaluation of possible superiority of landraces in organic farming
- Research on relationships among the human factor and conservation of landraces
- Ethnobotanical and socioeconomic research
- Population and conservation biology research
- Crop improvement research including research in mass selection and simple breeding
- Research and extension studies for little-known crops including seed production, marketing and distribution
- Strategy planning at national and international levels.

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Annex 1. Examples of country reports on on-farm experiences in Europe

Belgium

Since 1975, the Department of Biological Control and Plant Genetic Resources (DBCPGR) has been collecting fruit tree cultivars, mostly landraces traditionally grown in Belgium. There are over 2600 accessions in the collection with the majority being apple, pear and European plum. DBCPGR is developing an *in situ* orchards network in the Walloon Region of Belgium, as a response to a general public awareness for old fruit cultivars. Since 1994, 12 orchards have been planted in all parts of the Region, with public or private partners such as public administrations, environment protection associations and NGOs that have as objectives to conserve local fruit tree cultivars and/or to restore orchards of historical sites. Farm diversification is also one of the objectives. The didactic and pedagogic aspect is mostly done by NGOs. Orchard planting is mainly supported by the Walloon Region but also by cities, the EU and individuals. Another objective of the DBCPGR is the safe duplication of the *ex situ* collections where possible, for *Malus*, *Pyrus* and *Prunus* accessions.

Generally local people are involved in collecting local fruits and bud sticks, for maintenance of orchards and for fruit harvesting and processing. As an example, 20 years ago Dr Populer, gathered a lot of ethnobotanical information on old landraces. Such information is now seldom collected. People now collect a lot of fruit samples (sometimes 200-300) but without any knowledge about them, asking DBCPGR to identify the cultivars and their origin. The choice of cultivars for these orchards is based on their local origin, peculiarity, agronomic and phytopathological characters, taste and their global diversity of characteristics. Productivity criteria are seldom taken into consideration. DBCPGR also plant local cultivars collected by Dr Populer and which have now disappeared. DBCPGR duplicated some very rare or endangered cultivars. Most orchards are planted and maintained organically or with minimal maintenance.

The size of the orchards may vary from 0.05 to 3 ha. For a total area of 22 ha, more than 1600 fruit trees have been planted with cultivars of apple (103), pear (33), plum (34), cherry (17) and peach (4). Different rootstocks are used but mostly seedlings are used for planting as standard trees. The fruits are used for fresh fruit production or for fruit

processing (juice, cider, etc.). The cultivars come from the DBCPGR's *ex situ* collection (68% of cultivars) and from local organizations (32%). Currently, there are ten new orchards waiting to be planted in the Walloon Region. Before any plantation, the partners sign an agreement with DBCPGR for long-term maintenance of the orchard in good conditions and allow the DBCPGR to have access to the material. The agreement between the DBCPGR and the partners for establishing *in situ* orchards of old local cultivars clearly states the aim, partners, orchard location, some technical aspects, particular conditions and contract cancellation conditions.

Denmark

In Denmark the national programme for plant genetic resources is currently under preparation. For this purpose a survey of on-farm management and related activities has been carried out. The NGOs may organize mutual agreements, where their members are collecting information concerning species and collections maintained by individuals. Lists of PGR material available are published and forwarded to members and exchanged among them.

The most important NGOs in this field are 'Center for biodiversitetet' (English: Centre for Biodiversity) and 'Frosamlerne' (English: The Seed Collectors). More than 300 members of these organizations work mainly with vegetables and fruits like *Ribes, Fragaria, Malus* and *Prunus*, but also to some extent with old varieties of cereals. The crops are mainly grown by private individuals using organic or biodynamic methods in private gardens or by smallholders. The members look for old material with specific characteristics and are interested in maintaining old landraces if available. Part of the material may have been conserved in genebanks. The members collect information about the history of the varieties and evaluate their quality characteristics, resistance and storage qualities. Their conservation activities have not been supported financially. However, for publishing material about old varieties and minor species, the organizations have received a limited amount of public support.

Regarding ongoing on-farm management projects, a group of organic and biodynamic growers have started this year a project to test old cereal varieties (barley, wheat, oat and rye) through local production and to reintroduce the best varieties for organic production. The group intends to maintain and conserve the old varieties on-farm. The growers obtain old varieties from genebanks such as the Nordic Gene Bank. Growers have not yet received public financial support, but are most interested in participation if possibilities are provided within the ECP/GR *In situ*/On-farm Conservation Network.

Finland

The Plant Production Inspection Centre, Seed Testing Department carried out a project in 1997-99. The project proposed a system of characterization, registration and on-farm maintenance of landraces and old cultivars of cereals and forage grasses and legumes (Onnela 1999a). The aim was to devise a system that encourages research, conservation and the sustainable use of landraces and old cultivars. The first step is the varietal research based on the guidelines of the International Union for the Protection of New Varieties of Plants (UPOV). This research aims at describing the characteristics of landraces and old cultivars and at determining whether their morphological and phenological characteristics can be distinguished. Then distinct landraces and old cultivars may be registered and maintenance contracts can be drawn up. Such contracts could constitute a special form of environmental support in the new agri-environmental programme (2000-2006) implemented in Finland according to European Council regulation No. 2078/92. The farms where the landraces have been cultivated for decades are prioritized. In the case of registered old cultivars, breeders would primarily maintain cultivars, although they may forward this task to farmers. Within the system, the KTTK Seed Testing Department would act as the registering authority, and would be responsible for varietal research, registration, contracts, maintaining the official contract list, and

following up maintenance work.

The maintenance and support system described above will be implemented soon, and the farmers may apply for support for their on-farm management work. Before the support can be paid, the landraces and varieties have to be characterized and if proved unique, registered as mentioned earlier. The system proposal considered also the possibilities for marketing of registered and maintained landraces seed, which means alterations on the current seed marketing legislation. According to the amendments of EU seed directives concerning marketing of seed of 'conservation varieties', the updating work of Finnish seed legislation is now under way. Regarding the landraces of forage grasses and potato, it is worth noting that, at the moment, there are three landraces of timothy and one of potato in the Finnish National List of Plant Varieties. In their case, therefore, the production and marketing of certified seed is possible.

The Department of Social Sciences and Philosophy, Unit of Sociology in the University of Jyväskylä has formulated a research programme called 'Government, Voluntary Organizations, and Individual Savers as Actors in 'on-farm' Conservation of Local Farm Plants in Finland and Estonia'. The programme will start when the funding is confirmed. This social study concerns the social movement of farm plant germplasm conservation, and in particular voluntary civil activities in on-farm conservation and the active use of some landraces and old cultivars (i.e. cereal crops, some grasses and some vegetables) in Finland and Estonia.

Beyond this topic, but closely related to it, one can mention the inventory and breeding projects of hardy ornamental plants and berry and fruit species, which have been carried out by the Universities of Helsinki and Oulu.

With regard to the informal sector activities, in Finland the association Maatiainen ("landrace" in Finnish), a voluntary NGO established in 1989, has activities in conservation of plant genetic resources. The members of Maatiainen work mainly on an amateur basis. They search for and collect seed, and grow the landraces and old varieties, mainly of ornamental plant species, in their private gardens or field plots. The seeds are exchanged and sold among the network of seed savers. The newest seed catalogue of Maatiainen includes a total of 543 accessions of traditional ornamental and cultivated plant varieties. There are other associations in Finland which distribute seed of old varieties, like Hyötykasviyhdistys ("Association for Useful Plants") and Isoäidin Kasvit ("Grandmother's plants").

Recently the NGOs have organized regional inventory projects of old landraces and cultivars. In 1999 the association Northern Heritage started an apple project in Northern Savolax area. The project succeeded in finding several hundred local apple trees, of which the best were chosen to be tested in local nurseries.

Greece

Until recently the situation was immature for protection programmes and schemes for on-farm conservation. Much opposition was coming from the prevailing ideology of a strong competitive formal agriculture and the support for the maintenance of a strong seed trade system, intolerant to "inferior" landraces and non-breeder's material. The detrimental effect of these ideas to the agricultural biodiversity, the plurality of choices and the quality of life were largely ignored. Fortunately the situation has changed. Agriculture is now perceived in a more social and environmentally friendly context and room for lower-performing germplasm and less competitive practices is beginning to open up, at least in the EU legislation. The legalization of the use and trade of the local traditional varieties is expected to provide a strong momentum for on-farm conservation, in the framework of integrated local development schemes involving agriculture, landscape, habitats and local culture.

Plans for conservation were begun in 1990. Promising places with high species richness have been identified in the course of collecting expeditions of the 1980s and proposals were made to the authorities. However, funding has not yet been granted. The Ministry of Agriculture has identified a broader number of sites cultivating traditional varieties through surveys of its central and peripheral services and proposals by various scientific groups, farmers' associations and NGOs for environmental protection and ecological farming. The compilation of this work has been used to submit a major proposal for support of the traditional agriculture and maintenance of biodiversity to the EU in 1996, in the framework of the EU Directive 2078/92 that provides for the first time support for such an activity in the European Union countries. However, this proposal was not approved on the grounds of contradicting the established EU legislation on seed trade, which was considering the use and trade of seeds of landraces as illegal.

Recently a new proposal covering all aspects of PGR work was submitted, and there is a general optimism for its outcome. The proposal includes a provision for a specific national plan for on-farm conservation. The approval of this plan of action will be the first step toward this demanding exercise and to tackle all the complex issues related. Several interests can be raised such as the local communities to include the selected farms in their agri-environmental development plans, the state and the local communities to provide certain support, the academic community to provide funds for their active involvement in the characterization/evaluation of the landraces and in exploring management and monitoring systems. The integrated protection scheme should combine support for processing of named products, advertising, marketing and for maintaining local agricultural tradition and culture.

In most crops, the weight of the traditional agriculture is 1-2%. The landraces are maintained because they are linked to certain rituals, or because the cultivation of modern varieties is not suitable or rewarding in specific harsh environments. Farmers have access to germplasm, to new and diverse genetic materials, contributing to improvement of production of the existing crops, to yield increase and greater crop adaptability. Public institutes and private companies contribute most in providing germplasm to farmers.

Governmental institutions such as the Greek Gene Bank and a few NGOs are now engaged in projects researching and promoting on-farm management and improvement of PGRFA. The Greek Gene Bank has submitted a relevant programme. Until the programme is funded, its involvement is mainly on the identification of sites and contacts with the local farming communities and authorities. A few NGOs attempt at this stage to reintroduce local landraces and revitalize farmers' interest on such germplasm, particularly for biological farming. This effort is presently at an amateur scale. In the future, however, the need for characterization, identification and evaluation of the landraces, for the definition of the areas where their cultivation will be permitted, for monitoring their genetic integrity, etc. will make necessary the involvement of more professional agents (breeding institutes, companies or farmers' associations, etc.). Regarding the balance between *ex situ* and *in situ* conservation, practically only *ex situ* conservation related to on-farm conservation is implemented. Regarding programmes aiming to increase farmers' skills in crop identification, selection and breeding and seed maintenance, only informal training of amateurs and ecologically minded farmers exists on a limited scale.

Italy

Activities related to on-farm conservation in Italy are concentrated in the following 14 regions: Trentino Alto Adige, Lombardia, Toscana, Marche, Piemonte, Campania, Sardegna, Valle d'Aosta, Liguria, Friuli Venezia Giulia, Molise, Emilia Romagna and Veneto. Most of them are in the north centre of the country. Local crops and indigenous material are cultivated in their original sites (*in situ* conservation) such as fruit trees (apple, plum, peach, apricot, cherry, chestnut, grapevine, olive, fig, pear, lemon); vegetables (onion, asparagus, potato, pepper, rhubarb); legumes (pea, chickpea, "cicerchia" = *L.*

sativus and *L. cicera*); cereals, maize and forage species (lucerne or medica). Surface areas for on-farm conservation of vegetables generally do not exceed 1 hectare, but recorded exceptions exist (i.e. 'cuneo' pepper in Piemonte). Larger areas of cereals and forage landraces are managed. As for vineyards it is possible to find a few hundred hectares of local old cultivars (i.e. 'sacrantino' and 'grechetto'in Umbria) managed in different regions. In olive tree orchards, owing to the longevity of the plants, local old cultivars are managed to a greater extent (as probably in most other Mediterranean countries). Finally, it is also noted that many local varieties are sold as 'commercial varieties' by seed companies (i.e. 'romanesco' artichoke, 'precoce di iesi' cauliflower, 'quadrato d'asti' pepper, 'rossa di chioggia' cicory, 'delle cascine' faba beans, etc.). They certainly derive from landraces and contribute to the safeguard of genetic resources, even though each year a lesser number of them is found in catalogues, but the extent to which they have been bred, if breeding occurred, is uncertain. Only a thorough inventory could define the real extent of on-farm conservation in the country. On-farm conservation is probably greater than suspected until now.

Approximately 20 private associations, nurseries, farmers and private individuals aim to conserve and evaluate ancient local varieties, typical of their regions. Specialized nurseries for the cultivation of old and 'forgotten' plants publish their catalogues and propose the cultivation in private gardens.

Examples of private associations are:

- 'Quadrifoglio' (Belluno) for *Pom prussiano*, a local apple variety
- 'Civiltà contadina' (Forlì - Cesena) for other local apple varieties
- 'Pro-Vites' (Milano) for grapevine varieties of different Italian regions
- 'Archeologia Arborea' (PG) for local fruit tree varieties.

Examples of private farmers and mountain communities are:

- 'Il Vecchio Melo' farm for apple varieties of Piemonte Region (95 local accessions)
- 'Lago del Corvo' for cereals, maize and local apple varieties of Molise Region
- 'Villago' farm for local maize varieties of Veneto Region; local grape varieties in Trento Province
- 'Comunità Montana Lunigiana' for local apple varieties in Pisa Province
- 'Comunità Montana Canal del Ferro' for local pear ecotypes collected in the mountain site of Friuli Venezia Giulia Region.

Regional and provincial institutions are offices and agencies that aim to develop and sustain agriculture at regional or provincial levels. There are about 12 such institutions, e.g. Friuli Venezia Giulia (ERSA), Lombardia (Assessorato Agricoltura), Toscana (ARSIA), Marche (ASSAM), Abruzzo (ARSSA), Campania (SIRCA) and provincial consortiums as in Sassari (Sardegna Region) for fruit trees and in Provincia of Genoa (Liguria Region) for the local varieties of potatoes. Most of these institutions maintain *ex situ* conservation fields where one can study local species / varieties in order to maintain and improve them, and to reintroduce their cultivation among local farmers. Other institutions such as ARSIA–Toscana, ARSSA-Abruzzo and 'Assessorato Agricoltura-Lombardia' coordinate regional, provincial and local programmes that involve farmers directly in the cultivation and maintenance *in situ* of local species / varieties.

The traditional management is the most generally adopted method, but some examples of biological (organic) management are used in Liguria Region (potatoes), in Molise (private farm) and in Emilia Romagna Region (private association Civiltà contadina). The cultivation of local varieties is mainly linked to the traditional uses and local habits. The niche products are strictly connected to a specific market demand at a local level. The come-back of old taste and peculiar varieties increases the presence in the home gardens of previously abandoned germplasm. In the majority of cases, farmers themselves economically support the on-farm conservation initiatives. Farmers involved in

programmes coordinated by local, regional or provincial institutions receive reimbursements. The amount depends on the crop, location and surface grown. The results of the adoption at the regional level of the EU Regulation 2078/92 for the conservation of species at risk of erosion, is that out of 4 regions and about 10 crops reported, 1962 ha are being cultivated representing the support of 1134 million Lire. The Tuscany Region, thanks to the regional law L.R. 50/97, pays farmers involved in the cultivation of local endangered varieties a minimum of 100 000 Lire to a maximum of 400 000 Lire.

An Internet forum, in Italian, has been prepared to gather the information and to reach as many people as possible. The site can be consulted at the following address: <www.mclink.it/personal/MF0485/onfarm/index.html>.

Romania

In Romania, as in other eastern European countries, the cooperative and state farms were established during the socialist period. In the large fields of the lowlands old traditional cultivars and landraces have been replaced by new, modern varieties. However, 10% of the entire agricultural area have never been collectivized, including mainly isolated mountainous villages with small fields, often located on steep slopes with poor soil. Although genetic erosion is rapidly increasing, the 10% of the agricultural area still represents zones with traditional agriculture, where landraces and local varieties are valued in many families for their quality and special uses as part of the traditional life. Furthermore, the role played by women in Romanian rural households has always been very important. Both in fields and mainly in gardens, maintenance, multiplication and selection are some of the activities carried out by women.

At present, no institution is engaged in projects researching and promoting on-farm management. There were some attempts on the part of governmental institutions such as agricultural research stations, institutes and especially the National Genebank, to slow down the on-farm genetic erosion by persuading farmers to maintain their old seed varieties. However, neither the Genebank nor other institutions are involved in on-farm improvement programmes.

As early as the 1960s, institutes and agricultural research stations have used some old farmers' varieties (maize, rye and barley) to breed new cultivars, incorporating specific traits into local adapted materials. As a result of 12 years (1987-99) of exploring and collecting activities, the Romanian genebank identified the most important agrobiodiversity zones, considered as last refuges of the traditional agriculture, containing old varieties which belong to crops of major importance: maize, oat, barley, rye, wheat, potato, hemp and flax. Since on-farm conservation activities tend to decrease, maintaining the balance between *ex situ* and *in situ* conservation is a priority in Romania in order to reduce, to a certain degree, the irreversible loss of plant genetic resources for food and agriculture.

Farmers' access to new and diverse genetic materials, contributing to increase and improvement of yields, is to a large extent facilitated by governmental institutions such as agricultural research stations and institutes. Isolation in some difficult mountainous zones with specific pedoclimatic conditions limits the access to new germplasm, the farmers still preferring to keep and crop their old cultivars better adapted to local conditions. The recent economic situation prevents some farmers for buying seeds of new varieties, thus limiting access to new germplasm sources.

In Romania there are no programmes for cooperation between formal and informal sectors and to increase farmers' skills in crop identification, selection and breeding and seed maintenance. However, there are "zonal agricultural consulting centres", at the district level, as a bridge between national agricultural research staff and farmers. In such consulting centres no training courses for on-farm conservation are organized, but only informative activities mostly regarding agricultural techniques, diseases and pests control; introduction of new varieties are undertaken. The activities of the agricultural consulting centres are mainly developed according to environmental sustainability and farmers'

particular needs. Farmers' knowledge on selection (breeding, management, use and processing) of crops is necessary to improve on-farm activities and has been monitored to a small extent, by Suceava Genebank staff only. Furthermore, there are surveys on the population and conservation biology of some cultivars (maize, bean, potato) in certain zones with traditional agriculture. Research on crop improvement, including mass selection and simple breeding, as well as studies on little-known crops is about to be initiated.

Slovenia

Traditional agriculture in Slovenia has not survived in major agricultural regions; new cultivars were introduced in large areas. The main sources of old landraces and cultivars of crops are preserved in some underdeveloped and marginal regions where old farmers still cultivate them. Also in these regions erosion is more and more obvious. The programme of bio- (eco-) farming, where farms should be exploited without input of chemical fertilizers and pesticides, is under development. The interest in old cultivars is now growing again. The role of women in rural households is very traditional. Maintaining the seeds of some garden plants is one of their tasks since they are responsible for the garden.

Some institutions and firms maintain germplasm of some of the cultivars they develop. The Institute of Hop Research and Brewing is the major supplier of hop cultivars developed and bred by them. There is an Agricultural Institute of Slovenia where varieties of potato, grass and clover, beans and cabbage were developed from indigenous genetic sources. At the Biotechnical Faculty of Ljubljana University, the genebank of Buckwheat Semenarna is a firm which trades with seeds and has some domestic cultivars in the programme. Osvald is a privately owned enterprise devoted to breeding and production of some radichio cultivars. Limitations are in farmers' conviction that high-yielding cultivars of multinational companies are the best for them. In some above-mentioned segments, institutions have contacts with individual farmers concerning the maintenance of old seed samples. The genebanks are not engaged in on-farm improvement programmes. *Ex situ* conservation is institutionalized in genebanks; *in situ* is more sporadic, based often on the personal interest of the farmer and on informal cooperation with genebanks. Other institutions have possibilities for their own breeding fields and on-farm improvement is not widely practised. The Agricultural Institute of Slovenia and other genebanks also work on the identification of interesting cultivars. Some larger agricultural companies (former cooperatives) or individual farmers multiply varieties developed from landraces for distribution through Semenarna, a seed-producing company.

In the past, activities were more oriented toward the planning of agricultural production; they are now individually oriented. Market conditions are also taken into consideration since Slovenia is a candidate for the European Union and the existing market is going to change drastically. The extension service is organized regionally. Around 300 people are engaged in all aspects of consulting and promoting new knowledge. Farmers' knowledge is monitored sporadically but not as a continuous programme. Studies are carried out on population and conservation biology, crop improvement based on domestic cultivars including mass selection and simple breeding. There are extension studies for different medicinal plants, flax, *Camelina sativa* and old varieties of apples. Priority is placed on population and conservation biology and crop improvement research including research in mass selection and simple breeding but interest for research and extension studies for little-known crops including seed production, marketing and distribution is growing.

Sweden

On-farm management of cultivated species is mainly based on voluntary activities of the informal sector. The most active NGO with a wide seed savers' network is the Sesam Association. The cultivation of different useful plants is also demonstrated in outdoor museums. One example is Julita Estate and Museum, once a medieval monastery, now an estate, near Katrineholm. Several old varieties of apple, pear and ornamental plants like rose and peony are cultivated in the museum parks and gardens. Also hop, rhubarb, several medicinal and kitchen species are grown in Julita (<http://www.katrineholm.se/turism/julita.htm>). The collection of fruit varieties in Julita is one of the regional clonal archives of the Nordic Gene Bank (NGB). The Nordic fruit varieties and local cultivars are preserved in NGB's network of clonal archives. NGB keeps records of some 600 Nordic apple varieties, 100 pear varieties, and 100 varieties of plums and cherries.

Switzerland

Switzerland is very active in on-farm management. It is among the first European countries to have implemented the FAO Global Plan of Action in a national programme and to transfer the Convention on Biological Diversity into a national programme. The interesting approach is that there will be contracts for projects instead of general subsidies based on acreage. This might be a model for other European countries, but experiences with this approach are still at an early stage. The NGO Pro Specie Rara is particularly active in this area. Pro Specie Rara is a foundation working since 1982 to promote the conservation and use of genetic resources in both plants and animals. In plants, more than 1000 volunteer "seed savers" are coordinated by very few paid professionals. There are about 60 orchards with more than 1000 fruit cultivars in total. Crop-specific groups work on potatoes, tomatoes, grain crops and leguminoseae. Most people working within Pro Species Rara are individuals interested in genetic variation, cultural diversity and history. Farmers who have to cover their income from selling agricultural products seem to be a minority.

Ukraine

On-farm conservation of landraces is carried out in the Ukraine on the basis of individual initiatives, without any financial support. For example, spring rye (*Secale cereale* L.) is grown on a number of private farms of L'viv and Ivano-Frankivs'k regions, on a small scale (from 0.1 to 1 ha). In Chernyvtsi region, in several villages of Putyla district, the inhabitants grow an old local variety of maize named 'Gutsulskaya'. Local forms of faba bean are grown in many villages of the regions of Ivano-Frankivsk, L'viv, the Transcarpathian, Chernyvtsy. The acreage is up to 0.1 ha. For these crops, the type of management is traditional, and the main reason for maintaining these resources on-farm is for their traditional use. A cultivar of spring vetch (*Vicia sativa*), 'Kalus'ka misceva', is grown in Ivano-Frankivs'k region, in the village Zhivachiv, most often in mixture with oats and rape. Local vegetables such as beet, cabbage and onion, and spices such as garlic, fennel and poppy are grown in a number of villages, mainly in the western Ukraine. In the same region, a number of localities were identified where the inhabitants maintain old fruit trees. Dr Nadija O. Pilipchinets, a scientist from the Transcarpathian Institute of Agroindustrial Production, negotiated some agreements with farmers for the further maintenance of these old fruit trees, still used in the traditional ways.

United Kingdom

UK is the home country of one of the most active and well-known NGOs working on the conservation of traditional vegetable cultivars, the Henry Doubleday Research Association (HDRA). HDRA is an international NGO concerned with researching, demonstrating and promoting organic gardening, farming and food. For the past 20 years it has been campaigning on issues affecting plant genetic resources for food and agriculture, and is actively involved in the conservation of traditional vegetable varieties, suitable for

gardeners, through the work of its Heritage Seed Library (HSL), which is unique in the UK. HDRA's role in preserving plant genetic resources involves:

- Campaigning for a change in restrictive EU seed regulations
- The work of its Heritage Seed Library
- Collaboration with the UK Vegetable Gene Bank at the Horticulture Research International Genetic Resources Unit (HRI-GRU), Wellesbourne
- Assistance to Third World countries, as joint coordinator of the Seed Security Programme
- Research, as a collaborator in the EU Potato Trial CT95 34-45.

The Heritage Seed Library currently contains over 700 varieties covering all the main sorts of vegetables. Seeds kept in the library can be broadly categorized as follows: commercial varieties that may no longer be sold, heirloom and historical seeds. Our most usual sources of seeds are those that are deleted from the UK national list. As there is no official mechanism for ensuring that such seeds are preserved in a genebank, varieties that have managed to survive from the 19th century quickly become extinct. Heirlooms are seeds that have been handed down from one generation to the next, their origins often lost in family history. Perhaps the best example of this in the Heritage Seed Library is the crimson-flowered broad bean. Finally, there are those seeds with some historical or cultural significance. An example in the HDRA collection is the carlin pea – a tall, climbing variety grown for its dried peas. Carlin Sunday is the fifth Sunday in Lent and, in the northeast of England, it is traditional to eat a dish of carlins on that day. Another historical variety is ‘Lumpers’, the potato grown in Ireland in 1845 during the Irish Potato Famine.

From small beginnings, the Heritage Seed Library has grown to more than 8000 subscribing members. Because it is an offence to sell seeds of varieties that are not on the UK national list, the Heritage Seed Library offers them free of charge in return for an annual membership fee.

Seeds are grown at HDRA's Coventry headquarters, either outdoors or in polytunnels, according to the needs of the variety. However, because this could not possibly meet the demand, a network of over 250 volunteer ‘Seed Savers’ has been set up. Each individual undertakes to save the seeds of a specific variety and returns them to us for distribution. A catalogue is produced in December each year and seeds are sent out in January. In 2000, 30 000 packets were despatched.

Compilation, from existing sources, of a consolidated list of guidelines for the practical implementation of in situ *conservation of wild relatives*

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Several publications deal in detail with this subject. A compilation of existing guidelines will be completed as part of the Task Force workplan (see Part II, Session 3).

It is useful to note that in 1998 and 1999, two expert meetings took place in Germany on the conservation of populations of wild plants from Central Europe. The following recommendations were made:

- Geographical mapping of species is an important basis for conservation (this task has been completed or is under way in many European countries; data will be available in about 3 years)
- Geographical mapping of biotopes (in progress in many European countries)
- Site-specific mapping (GIS) (planned for some priority sites)
- Conservation of the genetic diversity in plant genetic resources belongs to the subjects of nature conservation
- The conservation management practices already established for certain biotopes are also suitable for plant genetic resources
- The conservation of genetic diversity must be monitored using molecular markers. In addition, the impact of management practices on genetic diversity has to be monitored
- Certain marginal sites cannot be conserved due to the atmospheric nitrogen input (4 kg / ha per year), which is changing the composition of the plant communities.

Preparation of a preliminary list of priority target species for in situ *conservation in Europe*

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A recommendation of the European Symposium (Gass *et al.* 1999) suggested a list of criteria to assist countries in determining priorities for *in situ* conservation. A first stage in the preparation of a preliminary priority list at the European level is the survey of the Council of Europe's catalogue of wild relatives of European cultivated plants (Heywood and Zohary 1995).

The great advantage of the catalogue is to propose a list of European wild forms related to cultivated plants. Only the close wild relatives belonging to the primary wild genepool are listed. For the main timber trees, fodder crops, medicinal and ornamental plants, only the main cultigens are included. Although the catalogue is incomplete, since several wild crop relatives are not included, it still remains the best reference for determination of priority target species.

Table 1 shows an extract of this catalogue where forest and ornamental species have been eliminated, leading to a total of 140 species. The wild species are listed in the first column, the relevant cultivated plant in the second one and the geographical distribution in the last one.

The bases to choose the priority target species are therefore those 140 wild species. However, we should probably start basing our choices on the list of cultivated plants. We need criteria to make the choice. But first let me tell you how we have reasoned about these aspects in France.

The French process for the organization of *in situ* management of wild relatives

In France, the State Authorities have adopted in 1998 a National Charter for the Management of Genetic Resources (BRG 1999). This system organizes the management of plant genetic resources through networks. Currently 25 crop networks are established for temperate plants. They are mostly centred on *ex situ* conservation, characterization, database documentation and distribution.

A specific network has, however, been established for the *in situ* management of genetic resources, of "wild species relative to cultivated species", which is linked to most other networks. As the involved stakeholders are different from those who participate in the other networks, we have made the choice to build a horizontal platform including all the species concerned with *in situ* conservation. This network gathers a lot of people, managers of wild flora or natural spaces and scientists but also some managers of the *ex situ* networks. The network's objective is to inventory and monitor the genetic resources *in situ*, as well as to carry out *in situ* management and *ex situ* evaluation, seed exchange and reintroduction *in situ*.

The establishment of a list of the wild relatives present in France was our first step (Chauvet *et al.* 1999). Out of the approximately 177 species of the Council of Europe catalogue of wild relatives of European cultivated plants, 130 are present in France: 9 are forest trees and 35 are ornamental plants. The 86 remaining species are relative to fruit, vegetable, fodder, medicinal and field crops. The French *in situ* network has to take into consideration the 121 species listed, excluding the forest trees that are under the competence of the "Forest trees resources network".

To initiate the process, 25 target species have been defined (Annex 1). Different criteria have been used, the main one being the existence of a suitable resource person. The second step aimed to produce a complete species form for each of the 25 species (Annex 2). The model form has been prepared by a group of experts, who defined all the relevant criteria without any hierarchical order: level of knowledge, state of present research,

threats on the species and especially on its genetic diversity, importance as a genetic resource, protection status, distribution within natural reserves.

A first analysis of the completed forms shows a distribution of the target species into three categories:

1. Species for which a sufficient level of knowledge exists and with a protected status linked with existing threat to the species diversity
2. Species for which a sufficient level of knowledge exists, without protected status and insufficient knowledge on the level of threat to its genetic diversity
3. Species for which there is an insufficient level of knowledge, which requires scientific investigation.

It was decided to focus on the second category for *in situ* management planning. Three model genera were chosen: *Beta*, *Brassica* and *Olea*.

Coming back to the question of the best criteria to determine the European preliminary list of priority target species, ten criteria were defined by the European Symposium in Braunschweig (Gass *et al.* 1999):

1. Is the target species/ecotype/population threatened nationally, regionally or globally?
2. Does the species occur in a recognized protected area?
3. Is the species subject to environmental legislation at a national, regional or global level that requires conservation action?
4. If the species does not occur in a recognized protected area, does it occur in an area where ownership/control/access can be gained and monitoring undertaken?
5. Is it a 'keystone', 'umbrella', 'flagship' or culturally important species?
6. Is it a component of an ECP/GR or other crop network?
7. Ecogeographical range or specificity of the species.
8. Population size, structure and whether isolated, marginal, introgressed.
9. Breeding system and phenological characteristics of the species.
10. Once priority species have been determined, an effective strategy is to conserve those that occur in the same ecosystem or habitat, i.e. give priority to the conservation of sites that are rich in species of wild relatives.

The above criteria need to be clarified and ranked. The additional criterion of "the level of knowledge and of current research" has been very useful in the French process. If we combine these last criteria with the list of the existing ECP/GR networks and the wider distribution at the regional level, we can propose a first list to be discussed during the meeting (Annex 2).

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Table 1. Extract of the Catalogue of the Wild Relatives of Cultivated Plants Native to Europe, without forest and ornamental species (Heywood and Zohary 1995)

Wild species	Cultivated plant	Geographical distribution (see country codes at the end of table)
Juglandaceae		
Juglans regia L.	Walnut	Al *[1]Au Bu Gr *It Ju Rm *Si [Br Co Ga He Hs Hu Lu Rs(W, K, E) Tu][2]
Corylaceae		
Corylus avellana L.	Hazelnut	All Europe except Bl Cr Fa Is Sb
Corylus maxima Miller	Hazelnut	Gr Ju
Corylus colurna L.	Hazelnut	Al Bu Gr Ju Rm Tu
Fagaceae		
Castanea sativa Miller	Chestnut	Al Bu Gr Hu It Ju Sa Si Tu
Moraceae		
Ficus carica L.	Fig	*Al *Bl Co Cr Cy *Ga Gr Hs It Lu Rs(K) Sa Si *Tu
Cannabaceae		
Humulus lupulus L.	Hop	All Europe except Az Bl Cr Fa Is Sb
Cannabis sativa L.	Hemp	[Au Be Bu Co Cz Ga Ge Gr He Hs Hu It Ju Po Rm Rs(C) Sa Si]
Polygonaceae		
Rumex rugosus Campd.	Sorrel	All Europe except Az Bl Cr Gr Sb
Chenopodiaceae		
Beta vulgaris L. subsp. *maritima*	Beet	Al Az Be Bl Br Bu Co Cr Cy Da Ga Gr H Ho Hs It Ju Lu Sa Si Su Tu
subsp. *macrocarpa*		Bl Cr Gr Hs It Lu Sa Si
subsp. *patula*		Hs Lu
Beta patellaris Moq	Beet	Hs
Beta trigyna Waldst & Kit.	Beet	Bu Ju Rm Rs(K,W)
Beta nana Boiss.& Heldr.	Beet	Gr
Atriplex hortensis L.	Orache	[Au Bu Cz Ge Hu It Ju Po Rm Rs(C,W,K,E)]
Portulacaceae		
Portulaca oleracea L. (polyploid complex)	Purslane	Al Au Az Be Bl Br Bu Co Cz Ga Ge Gr He Ho Hs Hu It Ju Lu Po Rm Rs (C, W, K, E) Sa Si
Ranunculaceae		
Nigella sativa L.	Black cumin, fennel flower	Bu Cr Cy Cz Gr Hu It Ju To Rm Rs Tu
Berberidaceae		
Berberis vulgaris L.	Barberry	Al Au Be Bu Cz Ga Ge Gr He Ho Hs Hu It Ju Lu Po Rm Rs(B, C, W, K, E)
Lauraceae		
Laurus nobilis L.	Bay, bay laurel	Al Bl Co Cr Cy Ga Gr Hs Lu Ju Sa Tu
Papaveraceae		
Papaver somniferum L. subsp. *setigerum*	Opium poppy	Bl Co Ga Hs It Lu Sa Si
Capparidaceae		
Capparis spinosa L.	Caper	Al Bl Co Cr Cy Ga Gr Hs It Ju Rs(K) Sa Si
Cruciferae		
Isatis tinctoria L.	Woad	Native of parts of S.E. Europe and widely naturalized elsewhere in Europe
Barbarea verna (Miller) Ascherson	Land cress	Az Co Ga Hs It Lu Sa [Au Br Ba Hb He Ho Rs(W)]

Wild species	Cultivated plant	Geographical distribution (see country codes at the end of table)
Nasturtium officinale R. Br.	Green water-cress	All Europe except Fa Fe Is No Rs(N) Sb
Armoracia rusticana P. Gaertner, B. Meyer & Scherb.	Horseradish	[Al Au Be Br Bu Cz Da Fe Ga Ge Hb He Ho Hs Hu It Ju No Po Rm Rs(N, B ,C, W, E) Si Su Tu]
Camelina sativa (L.) Crantz	False flax, gold of pleasure	Al Au Be Br Bu Co Cr Cz Da Fe Ga Ge Gr He Ho Hu It No Rm Rs(N, B, C, W, K, E)
Brassica oleracea L. subsp. *oleracea*	Cabbage, cauliflower...	Ga, Hs, Br
subsp. *robertiana*	Cabbage, cauliflower...	Ga Hs It
Brassica rupestris Rafin	Cabbage, cauliflower...	Si
Brassica villosa Biv.	Cabbage, cauliflower...	Si
Brassica incana Ten.	Cabbage, cauliflower...	It Si
Brassica macrocarpa Guss.	Cabbage, cauliflower...	Si
Brassica insularis Moris.	Cabbage, cauliflower...	Co Sa
Brassica cretica Lam.	Cabbage, cauliflower...	Cr Gr
Brassica rapa L.	Turnip	Al Ba Bl Br Bu Co Cz Fe Ge Gr Hb Ho Hs Hu Is It Ju No Rm Rs(K, E) Sa Si Su
Brassica napus L.	Rape, swede	Widely naturalized
Brassica nigra (L.) Koch	Black mustard	All Europe except Bl Is Ns Sb
Sinapis alba L.	White mustard	All Europe except Sb
Eruca vesicaria (L.) Cav subsp. *sativa* (Miller)	Garden or salad rocket	Bl Bu Co Cr Ga He Hs Hu It Ju Lu Rm Rs(C, W, K, E)
Grossulariaceae		
Ribes rubrum L.	White and red currants	Be *Br Ga Ge Ho It
Ribes nigrum L.	Black currant	Au Be Br? Bu Cz Da Fe Ga Ge Ho Hu It Ju No? Po Rm Rs(n, B, C, W, E) Su
Rosaceae		
Rubus idaeus L.	Raspberry	All Europe except Az Bl Cr Cy Fa Is Lu Sb Tu
Rubus fruticosus L.	Blackberry, bramble	All Europe
Pyrus communis L	Pear	Al Au Be Br Bu Cz Da Ga Gr He Hs Hu It Ju Lu Po Rm Rs(C, W, E) Si
Pyrus eleagnifolia Pallas	Pear	Bu Rm Rs(k)
Pyrus spinosa Forssk. (= *P. amygdaliformis* Vill.)	pear	Al Bu Co Cr Ga Gr Hs It Ju Sa Si Tu
Pyrus nivalis Jacq.	Pear	Au Bu Cz Ga He Hu It Ju Rm
Malus sylvestris (L.) Miller subsp. *sylvestris*	Apple	Al temperate Europe except Bl Is Sb
subsp. *orientalis*		Tu
Sorbus domestica L.	Rowan, mountain ash	Al Bu Co Ga Ge Gr He Hs Hu It Ju Rm Rs(K) Sa Si Tu

Wild species	Cultivated plant	Geographical distribution (see country codes at the end of table)
Mespilus germanica L.	Medlar	Bu Ga Gr *It Rs(K) *Sa *Si
Crataegus azarolus L.	Azarole	Cr Cy Ga Hs Ir Si
Prunus webbii (Spach) Vierh.	Almond	Al Bu Cr Gr It Ju
Prunus spinosa L.	Sloe, Blackthorn	All Europe except Az Cr Fa Is Rs(N) Sb
Prunus cerasifera Ehr.	Plum	Al Bu Gr Ju Rs(K) Tu
Prunus cocomilia Ten.	Plum	Al Gr It Ju Si
Prunus brigantina Vill.	Plum	Ga It
Prunus avium L.	Sweet cherry	Al Au Be Br Bu ?Co Cz Da Ga Ge Gr Hb He Ho Hs Hu It Ju Lu No Po Rm Rs(C, W, K) Sa Su Tu [Bl]
Prunus cerasus L.	Sour cherry	[Al Au Br Bu Cz Da Fe Ga Ge Gr Hb He Ho Hs Hu It Ju Lu No Po Rm Rs(B, C, W, K) Su]
Prunus fruticosa Pallas	Sour cherry	Au Bu Cz Ge Hu It Po Rm Rs(C, W, E) Tu
Leguminosae		
Ceratonia siliqua L.	Carob	Al Bl Cr Cy Ga Gr Hs It Ju Lu Sa Si
Chamaecytisus proliferus (L.) Link subsp. *palmensis*		Canary islands
Lupinus luteus L.	Yellow lupin	Co Hs It Lu Sa Si
Lupinus albus L.	White lupin	Al Bu Cr Gr It Ju Tu
Lupinus angustifolius L.	Blue lupin	Bu Co Cr Ga Gr Hs It ?Ju Lu Sa Si Tu [Au Az Cz Ge He Hu Po Rm Rs(C, W)]
Galega officinalis L.	Goats rue	Al Au Bu Cz Ga Ge Gr Hs Hu It Ju Po Rm Rs(W, K, E) Tu
Glycyyrrhiza glabra L.	Liquorice	Al Bu Cr Ga Gr Hs It Ju Rm Rs(C, W, K, E) Sa Si Tu
Vicia villosa Roth.	Vetch	Al Au Bl Bu Co Cr Cy Cz Ga Ge Gr He Hs Hu It Ju Lu Po Rm Rs(N, B) Sa Si Tu
Lens orientalis (Boiss.) Schmalh.	Lentil	Gr
Lathyrus cicera L.	Grass pea	Al Bl Bu Co Cr Cy Ga Gr He Hs It Ju Lu Rm Rs(K, E) Sa Si Tu
Pisum sativum L. (including *P. arvense* L.) subsp. *elatius*	Garden and field pea	Al Bu Co Cy Ga Gr Hs It Ju Lu Rm Rs(W, K) Sa Si Tu
Trigonella procumbens		Au Bu Cz Gr Hu Ju Rm Rs(?C, W, K, E) Tu
Medicago sativa L.	Alfafa, lucerne	All Europe except Az Fa Is Sb
Trifolium repens L.	White clover	All Europe except Sb
Trifolium hybridum L.	Alsike clover	*Au Bu Cr *Cz Ga Gr *He Hs *Hu It Ju *Rm Rs(N, B, C) Tu
Trifolium incarnatum L.	Crimson clover	Al Au Be Br Bu Co Cr Cz De Fe Ga Ge Gr He Hs Ho Hu It Ju Lu No Po Rm Rs(W, K, E) Sa Si Su Tu
Trifolium pratense L.	Red clover	All Europe except Bl Cr Sb
Trifolium subterraneum L.	Subterranean clover	Al Az Be Bl Br Bu Co Cr Ga Gr Hb Hs Hu It Ju Lu Rm Rs(W, K) Sa Si Tu
Ornithopus sativus Brot.		Az Ga Hs Lu
Hedysarum coronarium L	Sulla	Hs It Sa Si
Onobrychis vicifolia Scop.	Sainfoin	Al Au Cz Hu Ju Rm
Linaceae		
Linum bienne Miller	Flax	Al Bl Br Bu Co Cr Cy Ga Gr Hb Hs It Ju Lu Rs(K) Sa Si Tu
Vitaceae		
Vitis vinifera L. subsp. *sylvestris*	Grapevine	Al Au Bu Co Cz Ga Ge Gr He Hu It Ju Rm Rs(W, K) Sa Si Tu
Punicaceae		

Wild species	Cultivated plant	Geographical distribution (see country codes at the end of table)
Punica granatum L.	Pomegranate	Al Bu Gr Ju
Cucurbitaceae		
Citrullus colocynthis (L.) Schrader	Watermelon	Gr Hs It Si
Umbelliferae		
Foeniculum vulgare Miller subsp. *piperitum*	Fennel	Al Az Bl Br Bu Co Cr Cy Ga Gr Hb Hs It Ju Lu Sa Si Tu
Apium graveolens L.	Celery	Al Au Az Be Bl Br Bu Co Cr Cy Da Ga Gr Hb Ho Hs It Ju Lu Po Rm Rs(W, K, E) Sa Si
Petroselinum crispum (Miller) A.W. Hill	Parsley	Coasts in South Europe
Carum carvi L.	Caraway	Al Au Be Bu Cz Da Fe Ga Ho Hs Hu It Ju No Po Rm Rs(N, B, C, W, E) Su [*Br Fa Hb Is Sb]
Pastinaca sativa L.	Parsnip	Al Au Be Br Bu Co Cz Ga Ge Gr He Ho Hs Hu It Ju Po Rm Rs(*B, C, W, K, E) Sa ?Si Tu [Da Fe Hb Lu No Rs(N) Su]
Daucus carota L. (complex species)	Carrot	Most of Europe except Fa Is Sb
Oleaceae		
Olea europaea L.	Olive	Bl Cr Cy Ga Gr Hs It Lu Sa Si
Labiatae		
Melissa officinalis L.	Lemon balm	Al Bl Bu Co Cr Cy Ga Gr Hs It Ju Rm Sa Si
Satureja hortensis L.	Summer savory	Al Ga Gr Hs It Ju
Origanum vulgare L.	Marjoram, oregano	All Europe escept Az Bl Cr Fa Is
Thymus vulgaris L.	Thyme	Co Ga Hs It
Mentha suaveolens Ehrh.	Mint	Al Az Be Bl Br Co Cr Ga Ge Gr He Ho Hs It Lu Sa Si Tu
Mentha spicata L.	Spearint	[Al Au Az Be Bl Br Bu Cr Cz Da Ga Ge Gr Hb He Ho Hs Hu It Ju Lu No Po Rm Rs(W, K) Su Tu]
Rosmarinus officinalis L.	Rosemary	Bl Co Cr Cy Ga Gr Hs It Ju Lu Sa Si
Lavandula angustifolia Miller	Lavender	Co Ga Gr Hs It Ju Sa Si
Salvia officinalis L.	Sage	Al *Ga Gr *Hs Ju
Salvia sclarea	Clary	Al Bl Bu Co Ga Gr Hs It Ju Lu Rm Rs(W, K) Sa Tu [Au Cz He]
Solanaceae		
Atropa bella-donna L.	Deadly nightshade	Al Au Be Br Bu Co Cz Ga Ge Gr He Ho Hs Hu It Ju Lu Po Rm Rs(W, K) Sa Si Tu
Scrophulariaceae		
Digitalis purpurea L.	Foxglove	Az Be Br Co Cz Ga Ge Hb Hs Lu No Sa Su
Digitalis lanata Ehrh.	Foxglove	Al Bu Gr Hu Ju Rm Tu
Valerianaceae		
Valerianella locusta (L.) Laterrade	Lamb's lettuce	All Europe except Az Bl ?Cr Fa Is Rs(N) Sb
Dipsacaceae		
Dipsacus ferox Loisel.	Teasel	Co It Sa
Compositae		
Chamaemelum nobile (L.) All.	Chamomile	Az Br Ga Hb Hs Lu
Chamomilla recutita (L.) Rauschert	Wild chamomile	All Europe except Az Fa Hb Is Rs(N, Sb)
Tanacetum vulgare L.	Tansy	All Europe except Az Bl Cr Cy Sb
Tanacetum parthenium (L.) Sch. Bip.	Feverfew	Al Bu Gr Ju

Wild species	Cultivated plant	Geographical distribution (see country codes at the end of table)
Tanacetum cinerariifolium (Trev.) Sch. Bip.	Pyrethrum	Al Ju
Artemisia absinnthium L.	Absinthe	All Europe except Az Bl Cr Cy Fa Is Sa Sb Si Tu
Artemisia abrotanum L.	Southernwood	[Au Cz Ga Ge He Hs Hu It Ju Rm Rs(N, C, W, E)]
Artemisia dracunculus L.	Tarragon	Rs
Cynara cardunculus L. (incl. *C. scolymus* L.) var. *sylvestris*	Globe artichoke	Bl Co Ga Gr Hs It Lu Sa Si
Cichorium intybus L.	Chicory, endive	All Europe except Fa Is Sb and probably also Fe Hb No Rs
Cichorium endivia L. subsp. *divaricatum*	Escarole	Al Bu Co Cr Cy Ga Gr Hs It Ju Lu Si Tu
Scorzonera hispanica L.	Black salsify	Al Au *Bl Bu Cz Ga Ge GR Hs Hu It Ju Lu Rm Rs(C, W, K, E) [He ?Po]
Tragopogon porrifolius L.	Salsify	Bl Bu Co Cr Ga Gr Hs It Ju Rm Sa Si Tu [Au Be Br Cz Da Ge Hb He Ho Su]
Lactuca serriola L.	Lettuce	All Europe except Fa Is Sb
Lactuca saligna L.	Lettuce	Al Be Bl Br Bu Co Cr Cz Ga Ge gr Ho Hs Hu It Ju Lu Rm Rs(C, W, K, E) Sa Si Tu
Liliaceae		
Allium schoenoprasum L.	Chives	Au Br Bu Co Cz Da Fe Ga Ge Gr Hb He Ho Hs It Ju Lu No Po Rm Rs Su
Allium ampeloprasum L.	Leek	Al Bl Bu Cr Cy Ga Gr Hs It Ju Lu Rm Sa Si Tu
Asparagus officinalis L.	Asparagus	Al Au Be Br Bu Co Cz Da Ga Ge Gr Hb He Ho Hs Hu It Ju Lu Po Rm Rs(C, W, K, E) Si Su Tu
Iridaceae		
Crocus cartwrightianus Herbert	Saffron crocus	Gr
Graminaceae		
Festuca pratensis Hudson	Fescue	All Europe except Bl Cr Lu Sb Tu
Festuca rubra L.	Red fescue	All Europe except Bl Cr Sa Tu
Lolium multiflorum Lam.	Italian ryegrass	Al Az Bl Bu Co Cr Ga Gr Hs It Ju Lu Rm Sa Si Tu
Lolium perenne L.	Perennial ryegrass	All Europe except Sb
Dactylis glomerata L. (complex species)	Cock's-foot	All Europe except Sb
Bromus inermis Leysser		Au ?Be Bu Cz Ga Ge Ho *Hs Hu It Ju Po Rm Rs(N, B, C, W) Tu
Triticum boeoticum Boiss.	Wheats	Al Bu Gr Ju Rs(K) Tu
Aegilops speltoïdes Tausch	Wheats	Bu Gr Tu
Secale montanum Guss.	Rye	Al Bu Gr Hs It Ju Rm Si
Hordeum spontaneum C. Koch	Barley	Cr
Avena sterilis L.	Oats	All Europe except Fa Gr Is Sb
Avena fatua	Oats	All Europe except Fa Gr Is Sb
Phleum pratense L.	Timothy	All Europe except Bl Cr Sb
Cynodon dactylon (L.) Pers.	Bermuda grass	Al Au Az Bl Br Bu Co Cr Cy Ga Gr He Ho Hs Hu It Ju Lu Rm Rs(C, W, K, E) Sa Si Tu Canaries
Setaria viridis (L.) Beauv.	Foxtail	All Europe except Az Br Fa Hb Is Rs(B) Sb
Palmae		
Phoenix theophrasti Geuter	Date palm	Cr

Wild species	Cultivated plant	Geographical distribution (see country codes at the end of table)
Phoenix canariensis Hort.	Date palm	Canaries
Cyperaceae		
Cyperus esculentus L.	Tiger or chufa nut	Al Ae Bu Co Ga It Lu Si

(1) *: asterisk indicates doubt as to the native status of the taxon concerned.

(2) []**:** Square brackets indicate the naturalized occurrence of the taxon.

Country codes (used in Flora Europaea)

Al	Albania
Au	Austria with Liechstenstein
Az	Açores
Be	Belgium with Luxembourg
Bl	Islas Baleares
Br	Britain including Orkney, Zetland and Isle of Man, excluding Channel Islands and Northern Ireland
Bu	Bulgaria
Co	Corse
Cr	Kriti (Crete) with Karpathos, Kasos and Gavdlos
Cy	Cyprus
Cz	Former Czechoslovakia
Da	Denmark (Dania) including Bornholm
Fa	Færöer
Fe	Finlanf (Fennia) including Abvenanmaa (Åland Islands)
Ga	France (Gallia) with the Channel Islands (Îles Normandes) and Monaco, excluding Corse (Co)
Ge	Germany
Gr	Greece excluding those islands included under Kriti (Cr) and those which are outside Europe as defined in Flora Europaea
Hb	Ireland (Hibernia); both the Republic of Ireland and Northern Ireland
He	Switzerland (Helvetia)
Ho	Netherlands (Hollandia)
Hs	Spain (Hispania) with Gibraltar and Andorra, except Islas Baleares (Bl)
Hu	Hungary
It	Italy including the Archipelago Toscano, excluding Sardegna (Sa) and Sicilia (Si)
Ju	Former Jugoslavia
Lu	Portugal (Lusitania)
Rm	Romania
Rs	Former territories of USSR (N: Northern division: Arctic Europe, Karelo-Lapland, Dvina-Pecora; B: Baltic division: Estonia, Latvia, Lithunia, Kaliningradskaja Oblast'; C: Central division: Ladoga-Ilmen, Upper Volga, Volga-Kama, Upper Dnepr, Volga-Don, Ural; W: South-western division: Moldavia, Middle Dnepr, Black Sea, Upper Dnestr; K: Krym (Crimea); E: South-eastern division: Lower Don, Lower Volga, Transvolga)
Sa	Sardegna
Sb	Svalbard with comprising Spitsbergen, Björnöya (Bear Island) and Jan Maten
Si	Sicilia with Pantellaria, Isole Pelagie, Isole Lipari and Ustica, also the Malta archipelago
Su	Sweden (Suecia) including Öland and Gotland
Tu	Turkey (European part), including Gökçeada (Imroz)

Annex 1. List of French target species

Aegilops L.
- *A. geniculata* Roth.
- *A. neglecta* Req.
- *A. triuncialis* L.
- *A. ventricosa* Tausch
- *A. lorentii* Hochst.

Agropyron cristatum (L.) Gaertn. subsp. *pectinum* (M.Bieb)

Allium L. subgenus *Allium*
- *A. scorodoprasum* L.
- *A. acutiflorum* Lois.
- *A. scaberrimum* Serres
- *A. ampeloprasum* L.
- *A. commutatum* Guss.
- *A. porrum* L.
- *A. ampeloprasum* L.

Beta vulgaris L. subsp. *maritima* (L.) Arcangeli

Brassica insularis Moris

Brassica oleracea L.

Crambe maritima L.

Cyclamen L.
- *C. balearicum* Willk.
- *C. hederifolium* Aiton
- *C. purpurascens* Miller
- *C. repandum* Sibth. & Sm.

Dactylis glomerata L.
- *D. glomerata* subsp. *aschersoniana* (Graebner)
- *D. glomerata* subsp. *reichenbachii* (Hausm.)

Daucus carota L.

Fragaria L.
- *F. moschata* Weston
- *F. vesca* L.
- *F. viridis* Weston

Gladiolus L.
- *G. communis* L. subsp. *communis*
- *G. communis* subsp. *byzantinus* (Miller)
- *G.* x *dubius* Guss.
- *G. palustris* Gaudin

Lavandula L.

Malus sylvestris Miller

Medicago falcata L.

Olea europea L. subsp. *sylvestris* (Miller) P.Fourn.

Prunus brigantina Vill.

Pyrus L.
- *P. cordata* Desv.
- *P. nivalis* Jacq.
- *P. pyraster* (L.) Burgsd.
- *P. pyraster* (L.) Burgsd. subsp. *achras* (Gaertn.) Stohr

Raphanus sativus L.

Ribes L.

Rosa gallica L.

Rosa canina L.

Rubus L.

Viola hispida Lam.

Vitis vinifera L. subsp. *silvestris* (C.C.Gmelin) Beger in Hegi

Annex 2. Form for information on French species

Writer(s) of the form and address

Species introduction

- Introduction of the cultivated plant and its genetic pool inside the botanical genus (or more).
- Existence of a network for the cultivated plant (coordinator, wild species in *ex situ* collection).
- Past and potential interest of the wild relatives for breeding. Ecological interest. Heritage interest.

Biology

- Taxonomy of species with genomes and ploidy level.
- Flower biology and reproduction (pollination, sexual reproduction or not, incompatibility, etc.).
- Demography, lifetime, etc.
- Seed physiology.
- Structure of genetic diversity (morphological characters, biochemical characters, molecular characters).

Ecology/chorology

- Global and French distribution area, with maps.
- Habitat.
- Structure of populations (social or scattered).
- Indigenous or naturalized status.
- Existence of predators or parasites.

Evaluation of threat

- Status according to IUCN criteria.
- Threats on ecosystem or habitat.
- Introgression risks with cultivated plants.

Indicators for the management

- Identification of knowledge gaps and methodological bolts.
- Identification of modifying factors on populations (human practices, etc.).
- Possible types of management (*in situ*, *ex situ*, ecosystem management, ordinary observation, etc.).
- Identification of possible stakeholders involved in ownership, in control of envisaged sites and in management.

Conclusion

Schedule of knowledge and definition of priorities.

Bibliography

Annex 3. Proposals for a preliminary list of priority target species for *in situ* conservation in Europe

Aegilops speltoïdes Tausch

Allium schoenoprasum L.*, Allium ampeloprasum* L.

Apium graveolens L.

Avena sterilis L., *Avena fatua*

Beta vulgaris L. subsp. *maritima,* subsp. *macrocarpa,* subsp. *patula, Beta patellaris* Moq, *Beta trigyna* Waldst & Kit.

Brassica oleracea L. subsp. *oleracea,* subsp. *robertiana, Brassica rupestris* Rafin, *Brassica villosa* Biv., *Brassica incana* Ten., *Brassica macrocarpa* Guss., *Brassica insularis* Moris., *Brassica cretica* Lam., *Brassica rapa* L., *Brassica napus* L., *Brassica nigra* (L.) Koch

Bromus inermis Leysser

Camelina sativa (L.) Crantz

Castanea sativa Miller

Corylus avellana L.*, Corylus maxima* Miller, *Corylus colurna* L.

Cynara cardunculus L. (incl. *C. scolymus* L.) var. *sylvestris*

Dactylis glomerata L. (complex species)

Daucus carota L. (complex species)

Festuca pratensis Hudson, *Festuca rubra* L.

Glycyrrhiza glabra L.

Humulus lupulus L.

Isatis tinctoria L.

Lactuca serriola L., *Lactuca saligna* L

Lathyrus cicera L.

Lavandula angustifolia Miller

Lolium multiflorum Lam., *Lolium perenne* L.

Lupinus luteus L., *Lupinus albus* L., *Lupinus angustifolius* L.

Malus sylvestris (L.) Miller subsp. *sylvestris,* subsp. *orientalis*

Medicago sativa L.

Olea europaea L.

Papaver somniferum L. subsp. *setigerum*

Petroselinum crispum (Miller) A. W. Hill

Pisum sativum L. (including *P. arvense* L.) subsp. *elatius*

Prunus webbii (Spach) Vierh., *Prunus spinosa* L., *Prunus cerasifera* Ehr., *Prunus cocomilia* Ten., *Prunus brigantina* Vill., *Prunus avium* L., *Prunus cerasus* L., *Prunus fruticosa* Pallas

Pyrus communis L., *Pyrus eleagnifolia* Pallas, *Pyrus spinosa* Forssk. (= *P. amygdaliformis* Vill.), *Pyrus nivalis* Jacq

Ribes rubrum L., *Ribes nigrum* L.

Rubus idaeus L., *Rubus fruticosus* L.

Scorzonera hispanica L.

Sinapis alba L.

Trifolium repens L., *Trifolium hybridum* L., *Trifolium incarnatum* L., *Trifolium pratense* L.*, Trifolium subterraneum* L.

Vicia villosa Roth.

Vitis vinifera L. subsp. *sylvestris*

Man and the Biosphere (MAB) and ECP/GR cooperation

Vladimir Soldatov

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It is obvious that the Man and the Biosphere Programme of UNESCO (MAB) in many points overlaps with the European Cooperative Programme for Crop Genetic Resources Networks (ECP/GR). Some actions for initiating cooperation between these programmes started at the Braunschweig meeting in 1998 where a MAB representative gave a presentation on the prospects of possible cooperative work. An ECP/GR representative further supported the idea at the EuroMAB meeting in Cambridge (UK) in April 2000. At present the possible fields of cooperation between MAB and ECP/GR are outlined and further activity can proceed in the direction of establishing formal links between the coordinators of both programmes as well as opening direct contacts between scientists in their specific fields. A product of MAB research, which can be useful to ECP/GR specialists, is the Biological Inventory System for Vertebrate Animals and Vascular Plants. This inventory was designed to allow users to enter, edit and create checklists and reports, and to enter records of individual field observations in order to monitor biological populations over time. The Inventory is available as a CD-ROM and can be requested from the MAB Secretariat.

MAB is an intergovernmental interdisciplinary programme conducting research in many different fields concerning interrelations between human beings and the environment. It offers opportunities for promoting both *in situ* and on-farm conservation of PGRFA.

The MAB programme unites 120 countries worldwide. Thirty-two European national programmes (also including Canada and USA) form the EUROMAB network. The main instruments of the MAB programme are the biosphere reserves. At present the world net consists of about 350 biosphere reserves in 85 countries and 180 reserves are registered in Europe.

Biosphere reserves are ideal sites for *in situ* conservation of plant genetic resources because they include strictly protected core areas where the ecosystems are kept in their original conditions and existing populations of wild plants are not disturbed by anthropogenic activity. They are protected on a legal and long-term basis. Biosphere reserves are managed by administrative and scientific staff, who can provide permanent scientific advice and accumulation of well-ordered scientific information.

Biosphere reserves include 'maintenance zones' and 'development areas' which are, in fact, transition zones between the core area and the non-protected territories. These areas can also be used for *in situ* and on-farm conservation of PGRFA. They function with the participation of the local population. This means that the local farmers can benefit from conserving and managing plant genetic resources by being involved in specific projects or by direct marketing of valuable species.

Biosphere reserves are connected with the international networks. This gives the possibility of international sharing of know-how, knowledge and experience and of coordinating programmes and projects.

We think that the capacity of the biosphere reserves should be extensively used in the ECP/GR research projects. It is especially important to use the potential of local people and specialists who are already doing research and managing the reserves.

Large territories included in the MAB programmes are not covered by the ECP/GR programme. Cooperation between MAB and ECP/GR provides access for the latter to the vast block of information on plant genetic resources of the New Independent States of the former Soviet Union. Information on plant genetic resources in this part of the world is scarce and still not easily available, but a great part of it can be obtained through the MAB information system.

Pro Specie Rara

Martin Bossard
Director of Pro Specie Rara, Aarau, Switzerland

Pro Specie Rara (PSR) is a Swiss Foundation, founded in 1982. It works with both PGRFA and animal breeds. In the year 2000, ten part-time workers coordinate about 2000 seed savers and breeders of rare animals. The overall turnover is about US$ 600 000. Less than 50% stems from formal sources, mostly the Swiss national plan of action and subsidies for programmes on rare animal breeds. The rest is paid by private donors.

The plant projects are based on:

- A seed library system, where seed savers get seeds and multiplication instructions. They then multiply the seeds and send them back to the library together with a small form where they declare whether they keep the variety or not, and where they specify their experiences with the variety.
- Crop-specific projects in close collaboration with the formal sector, e.g. a potato virus cleaning system which includes cleaning by the Swiss research station in Changins, a microtuber multiplication carried out by the agricultural school of Flawil, and a few private seed producers in mountainous areas who maintain clean seed tubers under supervision of specialists.
- A system of seed saver gardens where a great multitude of varieties is shown to a wide public. Pro Specie Rara coordinates the set of varieties which is shown (and multiplied) at each place.
- A coordinated set of so-called "arboreta" or “heritage vineyards”. These are private collections (orchards or vineyards) with a minimum set of 25 fruit trees or 300 vine rootstocks with rare varieties that are under contract with PSR, which provides the trees or rootstocks. Private individuals are responsible for maintaining the orchard / vineyard in good condition as well as the right to consume all products. PSR also provides support for planting and technical advice in their maintenance. All plantations are controlled regularly and data are stored in a database.

Large databases are set up to monitor and coordinate the multiple work. Part of them is published and available on CD-ROM or diskettes. Soon, they will also be partly accessible via the Internet. Regular publications are produced for a larger public in four languages (French, English, Italian and German).

Underlying principles

To collect and to share

PSR is open to collect and exchange any type of PGRFA, obtained from mostly elderly people, from active researchers, from partner NGOs and from genebanks. All PGRFA are shared with anybody willing to work with them.

To involve a great diversity of people to conserve and manage biodiversity

PSR is convinced that genetic diversity is based on the different methods people use when they work with their plants. So it is important to let people work in different ways to keep a wide diversity, to adapt the variability to new environmental circumstances and to find new economic niches. In-garden management and conservation is a relict system of self-subsistence as well as a new area for further development of PGRFA under (western) Europe economic conditions.

Some people pay, others do the work

PSR projects are undertaken in collaboration between urban and non-urban people, where

urban people share their money and their ideas with farmers and gardeners.

A small professional centre coordinates a huge number of decentrallzed amateurs

Voluntary work is highly esteemed, because people are enthusiastic, idealistic and full of good will. Nevertheless, a certain amount of coordination is needed, which is carried out by a small number of PSR professionals.

Not only genetics, but also culture

PSR tries to include as many cultural aspects as possible, which always accompany a specific variety. PSR is convinced that the genetic and cultural aspects are equally important. Therefore, its projects are based on people and plant production systems and not only on gene conservation.

Not only conservation, but also development

As a consequence, PSR has to accept – as do other NGOs and genebanks – that their varieties may shift, adapt and vary over time. Therefore its work comprises both conservation and development of PGRFA.

European Forest Genetic Resources Programme – EUFORGEN

Jozef Turok
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Conservation of forest genetic resources in Europe

The EUFORGEN Programme was established in 1994 as the implementation mechanism of Resolution S2 adopted at the First Ministerial Conference on the Protection of Forests in Europe. Having a similar mode of operation as ECP/GR, the EUFORGEN Programme is overseen by a Steering Committee of National Coordinators from 30 participating countries. It operates through five networks and the coordinating secretariat is hosted by IPGRI. The outputs of the networking activities include European long-term gene conservation strategies and technical guidelines for different species or groups of species.

The main objective of gene conservation strategies in forestry is to create good conditions for future evolution of populations. As most forest trees are long-lived, undomesticated and outbreeding species with wide distribution, dynamic *in situ* conservation represents the main approach used. Managing and conserving forest genetic resources require good understanding of genetic structures and processes, in order to sample the diversity of wild populations. The Multiple Population Breeding System was developed by forest geneticists to effectively combine gene conservation with tree breeding. The EUFORGEN networks have discussed and suggested ways for application of this concept to a number of species in Europe.

Technical guidelines were also produced. They provide practical advice on methods and measures to be taken in genetic reserves. The recommendations target forest officers and agencies responsible for this area. They focus on the origin, size, silvicultural measures (e.g. thinning) and regeneration in genetic reserves. A survey recently conducted in 36 European countries indicated that a set of guidelines for genetically sustainable forest management in production forests had been widely adopted at national level, but only some of these are actually applied in practice.

Ammiad In Situ *Project, Israel*

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The wild tetraploid wheat *Triticum turgidum* var. *dicoccoides* is the ancestor of most cultivated tetraploid and hexaploid wheats. Its present world distribution and abundance are limited, and gene resources in primary habitats require conservation. An in-depth study of a native wheat population near the settlement of Ammiad, Eastern Galilee, was launched in 1983. *In situ* ecological studies were coupled with documentation of wheat demography, phenotypic variation of the wheat and disease incidence with *ex situ* progeny studies of genetic and phenotypic variation, including phytopathological aspects.

The objective of the study was to gain basic scientific information on the variable and representative population of this annual selfing wild cereal. The information was gathered to aid the rationalization of *in situ* conservation.

Research methods

- *In situ* ecological studies (climate, topography, rock relief, soil, floristic ordination, wheat demography)
- Annual sampling of wheat spikes along 250 permanent points of 4 transects
- Propagation of the annual collections in nurseries
- Genetic and phenotypic characterization of the collected accessions (storage proteins, allozyme polymorphism, morphological traits, phenotypic traits, phytopathological traits).

Indicators of diversity

- Clear-cut indicators of diversity used were electrophoretic markers, morphological traits that are encoded by single few genes (pigmentation, pubescence)
- Results from morphological and phytopathological indicators of diversity were often blurred by phenotypic plasticity.

Recommendations

Choice of site

- A series of small stations should undergo exploratory studies prior to choosing site(s)
- A location with variable topography and rock micro-relief might be the richest site for *in situ* conservation.

Grazing regime

- Moderate grazing reduces hazards of fire and competition of broadleaved plants
- Harmful effects of late grazing are the loss of variation through loss of immature spikes and induction of late tillers that cannot ripen.

On-farm development of German landraces of lentil (Lens culinaris *Medik.): an example of a strategy*

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Lentils in Germany – their cultivation and their use

Until the beginning of the 20th century, lentils were widely grown in Germany. According to Fruwirth (1914), lentils were grown on almost 40 000 hectares in 1878. Since then lentil production decreased rapidly and was nearly abandoned. The statistics for 1961-91 show some 5-26 ha. For the later years no data are available (FAO 2000). There are no breeding activities; the last variety was removed from the official list of varieties in 1966. According to my knowledge, traditional varieties have only survived in *ex situ* collections and there is no supply of adapted seeds (Völkel 1993). Lentils for cropping and consumption are imported from southern Europe or even North America. Nevertheless lentils have remained an important food. They are preferably eaten as soup during the colder months of the year. In 1998 imported lentils consumed in Germany amounted to about 20 000 t (FAO 2000). Lentils are traditionally grown on poor, calcareous soils (Becker-Dillingen 1929). The organic cultivation of such soils with low intensity is of great ecological importance to maintain habitats for a diverse fauna and flora. Lentils were often grown with a supporting crop to prevent lodging. Oats, barley and even winter rye have been reported by farmers as companion plants.

Strategies for on-farm development of landraces[1]

Improvement of seed supply and cultivation techniques

Since 1997 several landraces of central European origin from *ex situ* collections have been screened on farms. Since 1999, 11 of them, chosen for their typical and different appearance, are multiplied in Schönhagen/Thüringen, a traditional lentil-growing area, and seeds will be offered for 2001. Since 1998 small portions of landraces have been distributed through Dreschflegel (organic seeds of farm-based regional production). Until May 2000 about 1500 packets found their way to farmers, backyard gardeners, school gardens and other interested users. They serve for educational purposes more than production. Poor yields caused by wet years and/or lodging are the major problems in lentil production. Both can be reduced considerably by mixed cropping. The multiplication plots in Schönhagen are sown with a mixture of lentil and spring barley, mainly free-threshing forms. Research into sowing date, composition of mixture and weed control is carried out. Suitable pairs of lentil and companion crop have to be identified in order to minimize the costs to separate the seeds. Mixed cropping can also provide a chance to cultivate cereal landraces.

Dynamic development to further the process of regional adaptation

How does a variety develop on distinctly different farms? How does the mode of selection applied affect this development? These two questions led to the following experiment, carried out with three lentil landraces of different types. Seeds of the same origin were given in 1997 to three farms in northern and central Germany. During the period 1999-2001 three selection methods are applied: natural selection, positive mass selection and progeny testing. All these selection methods can be handled on-farm and can lead to living landraces.

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[1] In 1997 and 1998 the work was carried out by Dreschflegel and the Institute of Agronomy and Plant Breeding in Göttingen. In the following 3-year period the collaboration between the Institute and Ms Karin Weng, farmer in Schönhagen, is funded by the German Ministry of Food, Agriculture and Forestry.

Selection on all three farms is done by the author to investigate the effect of the selection site independent of the influence of the person selecting.

Restrictions and future needs

Living landraces require that farmers work with them continuously. Large-seeded *Vicia* species multiplying in lentil fields and the seed stock are the major reasons to buy new seeds after 2 or 3 years. Knowledge about seed storage, germination tests and selection methods is not sufficient. To keep a variety 'clean' and maintained under the best conditions, knowledge in handling a variety rather than a crop is required.

Looking at lentil cropping, we come across two other restrictions in the economic and legal spheres. Lentil production in Germany cannot compete with the wholesale prices. North American organic lentils in health food shops often undersell even French produce. Consequently local marketing structures need to be built up and strengthened. Lentils in Germany are not touched by the Seed Act, but the supporting crops to prevent lodging are. Be it *Avena sativa*, *Triticum aestivum*, *Triticum durum*, *Secale cereale* or *Hordeum vulgare*, potentially suitable landraces of all of them cannot be traded legally from farmer to farmer. We need a legislation that allows an easy seed flow of landraces, often heterogeneous and changing, and abandoned varieties, to be able to cultivate them for particular purposes and enhance diversity.

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Some data on Romanian farmers' knowledge and on-farm management

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Introduction

Including half of the Carpathian chain, mountains represent one-third of the Romanian surface. There are some 250 villages located between 800 and 1620 m altitude. Many of them are completely isolated, without road access for cars. Small fields often located on steep slopes with poor soil were never subjected to the cooperativization process.

Staff from the Suceava Genebank have identified three zones with very rich agrobiodiversity and of special interest for on-farm conservation activity: Bucovina, Maramure and Apuseni mountains. There, the old agricultural practices as well as local landraces and varieties of crops and fruit trees are still used. They are highly appreciated by farmers for special qualities (cereals, pulses, legumes, spices) and flavours (fruits). These plant genetic resources are conserved *ex situ* as crop seeds, tubers, meristem cultures at the Suceava Genebank and as seeds, tissue cultures or field collections at some other institutes and agricultural research stations throughout Romania.

Over 600 samples of old Romanian varieties from nine important fruit crops (plum, apple, pear, quince, sweet cherry, sour cherry, hazelnut, walnut, sweet chestnut) are conserved at 14 agricultural research stations and one institute. In some areas, traditional agricultural practices concerning crop selection, planting, harvesting and storage as well as processing and utilization are still used.

Selection of the planting material

In small farmers' households a positive selection is applied according to:

- Seed size: the largest and flawless grains of straw cereals (wheat, oat, rye and barley) and other crop small seeds are picked out by a special sifting process. For maize, all sound grains from certain cobs are selected except those from cob ends that are smaller, not uniform and with reduced biological value
- Seed colour
- Taste
- Flavour
- Cooking qualities
- Storage characteristics.

Besides the criteria already mentioned, farmers try to select seeds coming from plants resistant to lodging (i.e. straw cereals), to diseases or/and to pests (all crops). Farmers living in mountainous zones select and maintain seeds from plants resistant to local specific climatic conditions (cold, high humidity) and with a shorter vegetation period.

Planting

The traditional planting process in small Romanian farms presents some peculiar characteristics. Small fields and gardens grown with wheat, rye, oat, barley, maize, beans, pumpkins and sometimes intercropped with beet, cabbage and other vegetables, pulses and spices, are often bordered by hemp rows. Each farmer also manages a small garden dedicated to ornamental plants, which is mostly tended by women.

Regarding maize planting, the long experience generally prevents farmers from introducing new varieties or hybrids that could introduce the risk of modifying and causing the loss of their traditional maize qualities over time. Introduction of new cultivars is, however, made through:

- Planting only new material, or
- Protecting traditional varieties by inserting various crop species (such as hemp, flax,

wheat, oat and barley) as isolation barriers.

Bean and peas are sown separately, according to their type (bush or pole). In some zones (such as northern Bucovina), peasants prefer to plant a bean mixture of different morphological types and colour varieties which lead, in time, to a great genetic variability in seed shape and colour. In order to use more efficiently the space allotted to pole bean, in many gardens the farmers sow bean seed together with maize in the same planting hole (the creeping stalk of the first crop will use, as support, the stalk of the second one). For commercial reasons, the farmer carefully selects and separately plants two or three morphological types of the most requested beans for grain (white or variegated) or for pods.

Potato varieties such as those with dark violet long tubers and dark violet flesh or yellowish sickle shapes, mostly identified in the northern mountains of Bucovina, are planted either as whole or half tubers (when the planting material is sparse).

Besides some landraces of common wheat (*Triticum aestivum*), used for home-made bread, in Apuseni mountains (Brad Valley), einkorn (*T. monococcum*) is still cultivated as a fodder grain. Light, stony calcareous soils in this same area are suitable for einkorn, which is here more productive than common wheat and less attacked by wild animals.

Protection measures

In order to protect crops, in many farms hemp rows are used as a protective fence against animals and even pests (insects). In some areas of Bucovina and Maramures, hemp stalks are used to keep pests away from stored wheat grain. During the potato vegetation period, one of the most efficient measures against pests is planting garlic rows or wormwood close to the potato plants.

Harvesting and storage

Farmers' lands are often isolated and located on steep slopes, where the use of mechanical equipment is not possible. Depending on a household's revenue, the small yield is often harvested and carried on beasts of burden.

- Storage of crop produce is traditionally made depending on the species.
- Straw cereals grain is stored in dry and cool places (barns and/or garrets). When yield is low, the seeds are mostly kept in the garret, laid in a thin layer (5 -10 cm).
- Maize is stored as cobs, within a plank building permitting very good ventilation. Sometimes it is kept as grain when it is naturally well dried.
- Bean, pea and horsebean are kept as pods after drying in the sun and the wind. Some farmers, having a few seeds, keep them sorted by type, variety, colour and/or culinary use, in various vessels (e.g. cardboard boxes).
- Tubers and fruits are stored, as a rule, in cool cellars. Sometimes, fruits are dried and smoked (plums) or stored in vessels buried in the ground (apples) or kept between hay layers (apple, pear and quince).

Processing and use

For processing and use of plant genetic resources, certain small farmer's communities are maintaining traditional customs. Local maize varieties such as 'Hanganesc', 'Moldovenesc' and 'Lapusneac' are maintained by farmers for their culinary qualities. The Romanian traditional maize product "mamaliga" is a corn flour cooked with water to a tough mass. Depending on the different customs, various consistencies are produced and various ingredients are added: sugar, pumpkinseed oil, butter, cream, cheese, cranberry juice. Grain and corn stalks are used for animal feed.

Besides a few landraces of common wheat (*T. aestivum*) used for bread-making and animal feed, the grains of einkorn wheat (*T. monococcum*) are ground and, together with maize and common wheat, are utilized as fodder for pigs, cattle and hens. Rye, in higher

altitudes, is grown especially for distillery uses (brandy) and for animal feed. Local potato varieties are valued in certain dishes, mainly boiled or baked.

In all zones, most vegetables and some spices are used in various dishes. Mixed pickles are prepared with some of them. The preferred ones are cucumbers, green tomatoes, cabbage (white and red) and, in some zones (northern Bucovina), even small melons and bean pods as well as apple, pear and quince. Local pumpkins are widely grown for fodder purposes and seeds are used for oil or eaten roasted and salted.

Common beans (*Phaseolus vulgaris*) and runner beans (*Phaseolus coccineus*) are used for salads, mashed or baked, depending on shape, colour and fibre content of the hull. Spices such as savory, dill, celery, caraway, lovage and sweet basil are utilized in dishes and pickles. Some species are cultivated and used in various households as medicinal tea plants *(Malva crispa, Calendula officinalis, Chrysanthemum parthenium, Inula helenium*), odoriferous plants (*Geranium macrorrhizum, Tanacetum balsamita, Artemisia abrotanum, Artemisia absinthium*), spice and medicinal plants *(Artemisia dracunculus, Foeniculum vulgare, Papaver somniferum*, etc.).

Local varieties of fruits are consumed fresh or used in preparing a wide range of jams and compotes (sweet cherry, sour cherry, apple, pear, walnut, quince), soft drinks (apple, common elder tree flower), brandy and liqueurs (plum, pear, apple, sour cherry, cranberry) and cakes (walnut, sweet chestnut, hazelnut). In some farms of Maramures, old local crops for fibres (hemp and flax) are still processed for producing traditional clothes and towels.

Conserving and adding benefits to traditional varieties through the involvement of rural networks and communities

Massimo Angelini

Coordinator of the Committee for safeguarding of potato heritage varieties on Genoese mountain (Co.Re.Pa.), Genova, Italy

Traditional varieties are evidence of slow selection made by generations of peasants; they do not exist in the wild; they are manufactured and like a document, they can be read and interpreted, and tell a story. Slow selection makes them suitable for the landscape in which they have been reproduced. They may not be the most profitable, but are often the most resistant to that specific climate and hardy to diseases of that landscape. Moreover, if we examine and sum up every effect, we would find them sometimes to be the most lucrative, and their lower dependence on industrial chemical products shows their ecological value. They preserve identity and make local communities alive, because farmers and small nurseries reproduce them, not seed industries.

They have an unexpected economic value, sometimes a still potential economy, sometimes already existing, because they allow the creation of a small market that does not suffer from large market influences. Thus, they have a complex value.

To find them, we must go to who exchanges and handles them. Finding and preserving them is valuable work, from both an ethical perspective (biodiversity is in itself a value, and its richness measures survival hope for everyone) and an economic perspective (they represent a good potential income for mountain lands, made marginal by intensive agriculture).

Summary of the presentation

Before the 1950s, seeds were usually preserved by peasants on Italian mountains or reciprocally exchanged, and seed exchange was one of the bases of local economy.

Potatoes to sow, for example, went from highlands to lowlands every year. They were carried down from the higher villages to the lower ones (and carried down again, the year after) and exchanged for flour, wine and, rarely, money. This circulation of seed potatoes was also a good way to preserve their relative pureness. But after the 1960s, with the diffusion of rural cooperatives [*consorzi agrari*] selling high-yielding cultivars, everything changed: seed exchange stopped and peasants began to buy new varieties, progressively abandoning their own seeds. Now potatoes (and the other seeds) do not move any more from highlands to lowlands and from peasant to peasant, but rather from lowlands to highlands or from a shop to all peasants. This was a small revolution.

We could represent the first situation (before the 1950s) as a "net system", where seeds were interconnecting all peasants reciprocally, and the second situation (after the 1960s) as a "ray system", where the absence of exchanges made peasants more isolated. A net system is the abstract shape of a society based on communication (i.e. on community), but a ray system is the abstract shape of a society based on isolation (i.e. on television, on supermarket and so on). All this shows the social importance of finding, preserving and promoting local seeds and traditional cultivars in order to lace up again the threads of the rural net and to bring back to life the memory of the local communities. This also explains better that local cultivars are not only cultivars, but a piece of a complex social, historical and environmental puzzle, composed of local economy, transactions, traditions, knowledge, practices, landscapes, languages and other elements. Local cultivars give meaning to the whole puzzle. Without the cultivars we can only partially see the puzzle, and therefore cannot fully understand their value. Cultivars are then only good for being collected.

A contribution to the dialogue

Heritage varieties and rural communities

Landraces, resulting from a slow selection and handed down through the generations, are the result – and, at the same time, the source and the carrier – of specific rural knowledge applied to a specific landscape's resources. Being handed down, and being carriers of

knowledge about their selection and preservation, those varieties are a living expression of the local culture and proof of its persistence. This continuity over time becomes a category of historical analysis and rural anthropology. Far from being just an expression of culture and biological diversity, landraces today are the focus of international protection projects and actions about valorization of marginal rural areas. Their recovery could therefore represent a feasible way of compatible development. In fact, they are valued exactly where they were preserved, in the place where they maintain and transfer the value of well-adapted and ecological and social bonds. If removed, they would lose their value, and at the most become objects for a collection.

In order that heritage varieties may mobilize development for rural communities in marginal areas, the consciousness and the respect for some premises is necessary:

- Concerning landraces, an inflexible condition is that conservation is coupled to use (domestic and local); for this reason, strategies aiming at their local conservation have to include market aspects: “in order to preserve it’s necessary to eat”.
- Economic benefits deriving from landrace conservation must return to the rural communities that gradually, over time, selected and preserved them. This attributes – in fact, if not yet in law – to rural communities and farmers the same status as the founders of seed industries.
- Rural communities and single farmers, who bring their knowledge on landraces, must be enabled to become active protagonists in the actions for the preservation and valorization of heritage varieties, through involvement in decision-making and the control of those actions.

Nowadays, a great part of on-farm conservation activities is undertaken by different public or private actors with different methods and aims, and surely with a common element: the lack of communication, exchange, comparison between them, although each experience could get benefits from other's errors and failures. Starting from such reflections and with the aim of strengthening actions for on-farm conservation, some coordinated initiatives are proposed:

- Establishing a constantly updated Web site for exchange of news, information and data about ongoing on-farm conservation initiatives
- Carrying out a historical inventory of vegetable varieties, based on written sources, to be consulted for documentation and verification of their introduction (and of their names), diffusion and persistence in time; this is an initiative on which work has already begun together with Isabella Dalla Ragione (agronomist and coordinator of on-farm experiences on fruit in Central Italy) in order to set up a model project
- Monitoring model experiences of on-farm conservation and, consequently, establishing a locally adaptable method and strategy for the economic valorization of landraces and the benefit of rural networks and communities that have allowed their conservation.

The present attention to heritage varieties surely is the result of an increasing sensitivity toward questions linked to biodiversity; sometimes it is an effect of the fears produced by the quick process of world's economic globalization. But sometimes it is also the effect of a newly shaped consumerism, which is simply including niche's products in a new marketing strategy. In this case we assist deceitful marketing actions disguised under false ideals of preserving biodiversity. This is an additional reason for diligent monitoring to avoid dispossession and erosion of landraces.

Four proposals

Gathering and sharing information on a Web site

Proposed actions could be the following:

- Inventorying experiences of landrace recovery and of their valorization through involvement, with an active role, of farmers and rural communities
- Setting up and managing a European Web site aimed at gathering and sharing inventoried data and encouraging the comparison between coordinators and those responsible for on-farm experiences
- Besides the two functions of databank and meeting forum, this system could have other important connecting roles, such as offering an up-to-date agenda of scientific and public awareness issues on on-farm conservation and a Web door to enter other databanks, reviews and sites related to on-farm activities.

Historical inventory of traditional vegetables and fruit varieties

With the increasing interest in landraces, making them more and more a common choice for every territorial programming, the local and traditional cultivars lists (very heterogeneous in terms of method and research scale) have recently been multiplying. However, to ensure the persistence of varieties and associated practices and knowledge, instead of a generic recall of the past and its tradition, the adoption of rigorous tools based on historical sources is required. The need will therefore arise to support research and monitor activities about on-farm conservation with a historical inventory of traditional vegetables and fruit varieties, based on witnesses and citations collected from agronomic catalogues and manuals published until the 1950s.

The inventory would not only testify to a cultivars' introduction and persistence, but also to the dynamics of its propagation. This is not the only way to show evidence of the spread of a cultivar; it is known how landraces easily elude written sources (for they are sometimes known only in vernacular and local circles), but surely a historical inventory might be a useful, although not complete, milestone for landrace research.

Proposed actions could be the following:

- Searching for written sources and inventorying them
- Planning and developing a hypertext base for collecting and organizing data
- Going through the sources
- Gradual publishing of collected data and, eventually, pictures.

Monitoring and definition of a strategy

The starting of actions toward on-farm conservation requires deep reflection on what has been done until today. This should allow the formulation and diffusion of a strategic proposal, common in Europe but locally valid, to be submitted to governments and the EU, in order to encourage the adoption of specific financial support, and to be suggested to local administrations interested in on-farm conservation actions.

Proposed actions could be the following:

- Choice of a few model experiences for each country involved, for a limited number of species and for different varieties among the same species
- Monitoring of chosen experiences, paying attention particularly to the following parameters: (a) quality, size and progress of farm and rural community participation; (b) local importance and institutional stakeholders interested; (c) cultural recovery strategies and diffusion of adopted varieties; (d) marketing strategies; (e) critical points, socioeconomic and normative constraints; (f) relationship between foreseen and obtained results; (g) social, economic and environmental relapses on farms and in rural communities
- Progressive input to the net of monitoring data
- Final formulation of a proposal about a method comprehensive of critical and

qualifying points of studied experiences.

Diffusion of results

As the most immediate way of diffusion for the inventory is by printed and Internet publications, the proposal for a method could be communicated at different levels, local and general.

Proposed actions could be the following:

- At local level, organize seminars and courses for farmers and meetings to involve them and allow confrontation between political or social referees of local communities
- At a general level, organize conferences, draft and final publications of results of monitoring actions mentioned above, as printed and electronic documents available on the Internet
- Publications of historical inventory as printed and electronic documents available on the Internet
- These four actions need further detailed definitions of steps and a time frame for implementation, defining responsibilities and the human resources available. Moreover, identification of viable financial sources necessary for their development appears important.

Part II. Discussion and Recommendations

On-farm Conservation and Management Task Force

Participants: M. Angelini, M. Bossard, P. Freudenthaler, B. Horneburg, B. Laliberté, L. Maggioni, J. Ruiz Martínez, P. Marum, M. Mitteau, V. Negri, W. Podyma, J. Rode, A. Sartori, N. Stavropoulos, Z. Stehno, S. Strajeru and B. Visser

Session 1. Concept and definitions of on-farm conservation and management

Chair: Bert Visser

The concept and definitions of on-farm conservation and management generated considerable debate and discussion. The main points of discussion were as outlined below.

On-farm conservation vs. management

On-farm conservation and management of PGRFA describes a process that is highly dynamic and takes place in an ever-changing ecological and human environment. It not only refers to the conservation and management of crop genetic diversity but also to the mechanisms, in particular farmers' practices, which maintain the on-farm conservation and management systems. It concerns the conservation and continuous development of crop genetic diversity, through exchange, storage, selection and breeding, as part of and for the purpose of crop production, and under the agroecological conditions available to farmers and/or self-suppliers.

Recommendation

The recommendation from the Group was that, for the time being, reference should be made to on-farm conservation AND management.

Why on-farm management?

The main strengths of the system were acknowledged to be the coverage of diversity, the adaptive capability, the linkage with local knowledge and maintaining a full system. Another positive aspect is the improved access by local farmers to material conserved and managed on-farm and the improved documentation of local knowledge.

The weaknesses of the system were acknowledged to be its sustainable maintenance, the limited access to original material outside of the area of use, the limited documentation of the genetic material and the limited knowledge of the on-farm mechanisms.

Definition

The following definition was agreed:

> On-farm conservation and management of PGRFA concerns the conservation and continuous development of crop genetic diversity, through exchange, selection, breeding and storage, as part of and for the purpose of crop production, under the agroecological conditions available to farmers and self-suppliers.

It was also mentioned that on-farm conservation and management also deal with new introductions in the agroecosystems, although agreement of all Task Force's members could not be reached on this point and further clarification and elaboration of these concepts is needed.

Purpose in Europe

The following purposes were recognized as pertinent to on-farm conservation and management in Europe:

- To conserve and develop cultural landscapes (such as traditional crops, forages, etc.)
- To conserve and develop traditional diversity (such as fruit trees, underutilized and neglected crops)
- To maintain and develop crop diversity originating in Europe (such as vegetables, herbs and cereals)
- To maintain and develop diversity which is not covered by the formal sector.

Incentives

The following incentives were recommended as suitable to promote on-farm conservation and management in Europe:

- Access to markets
- No discrimination against traditional diversity by seed regulations
- No DUS/novelty requirements
- No financial barriers to marketing
- Supportive subsidy mechanisms.

In-garden conservation

In Europe, a certain proportion of on-farm conservation and management activities consists of "in-garden" conservation. A considerable amount of diversity of crop and fruit tree genetic diversity is still maintained in gardens.

Recommendation

It was therefore recommended that, acknowledging the importance of in-garden conservation and management in Europe, ECP/GR efforts should assist in supporting these activities.

Role of the formal and informal sectors in on-farm conservation and management

Farmers and hobbyists (also called self-suppliers) are regarded as the principal actors of on-farm conservation and management. In several cases, on-farm conservation and management is carried out within the context of organic farming. The Task Force emphasized the complementarity of the roles played by the formal and informal sectors and felt that they did not need to be categorized or separated.

Session 2. Inventory of on-farm conservation and management experience in Europe and legal aspects

Chair: Valeria Negri

The group acknowledged that the preliminary survey prepared by Valeria Negri, Heiko Becker, Johanna Onnela, Alisea Sartori and Silvia Strajeru was not exhaustive and should be completed. Information gathering had been difficult, owing to fragmentation of activities, involvement of different sectors (formal and informal) and the short time allowed to collect information. All these factors made it impossible to reach all the relevant people involved in on-farm conservation and management in Europe.

The Task Force confirmed the need to continue and maintain an ongoing survey of different on-farm conservation and management activities in Europe, to identify gaps and opportunities for collaborative work and to widely circulate the information.

The Task Force agreed that present seed legislation in the European Union is a major constraint for on-farm germplasm conservation of seed plants and suggests appropriate changes. However, the reception and enforcement by state members of Directive 98/95/CE on seed legislation of the Council of European Communities of 14 December 1998 was recognized to be the first step needed to solve problems related to landrace seeds and the need for free-of-charge registration. A subsequent step could be the adoption of a list or register of existing landraces, to be compiled as a result of systematic regional surveys. The Register would acknowledge the existence of autochthonous material belonging to different agricultural areas characterized by high levels of agrobiodiversity, local knowledge, history and traditions. Moreover, the Register would offer a baseline for decision on the implementation of appropriate safeguarding measures. However, the adoption of a register of existing landraces also raised concerns within the Task Force, since it would go against a dynamic process of conservation based on adaptation to an ever-changing environment. Additionally, the danger to discriminate between registered and non-registered varieties would still persist. Also the problem of definition of "landraces" was mentioned and the risk that those old varieties would remain excluded (such as the old wheat variety 'Probus', which was deleted from the main list of varieties and could not be entered on a landrace list). An alternative mentioned would be a "no list approach" for minor crops and garden plants, based on limited production quantities.

Recommendation

It was agreed that governments and local authorities could play a major role in implementing proper legislation and in supporting on-farm activities.

- The Task Force members of both the *in situ* and on-farm conservation Groups agreed to provide additional information of relevant on-farm conservation and management activities in Europe, including suggestions for action and contact addresses, to Valeria Negri, **by 30 June 2000**. The authors will revise the second draft of the survey including a list of contact addresses and the final document will be published on the ECP/GR Internet pages (<http://www.ecpgr.cgiar.org>) and included in the meeting report. [This document will aim to be a compilation of relevant examples of on-farm conservation and management activities in Europe, to the best knowledge of the authors at the time of preparation.]
- A subgroup composed of Martin Bossard, Paul Freudenthaler, Bernd Horneburg, Martine Mitteau and Johanna Onnela agreed to assess solutions presented by the formal and informal sectors (mostly NGOs) for the reception of Directive 98/95/CE.. [The Task Force agreed that NGOs' expertise and familiarity with farmers' needs could provide precious insights to the formal sector. As a result of this collaboration, the Task Force would be able to lobby for improved legislation.]

Workplan

1. Martin Bossard to mobilize the efforts of a number of NGO experts in order to compile a memorandum, listing the problems caused by current European legislation for the free exchange and use of non-registered seeds. The NGOs' document will be sent to Paul Freudenthaler **by 30 June 2000**.
2. All Task Force members to provide Paul Freudenthaler, **by 31 July 2000**, with information on seed legislation of their respective countries and other information available to them.
3. Paul Freudenthaler to collect information regarding seed legislation, with special attention to variety registration fees and to the state of development of laws permitting the use and trade of landraces in Europe.
4. All documents will be circulated to the subgroup for comments and recommendations

aiming at establishing effective lobbying strategies to facilitate the approval of appropriate seed legislation. The subgroup will also seek the opinion of the International Association of Plant Breeders (ASSINSEL) at this stage.

5. Documents and accompanying comments will be sent to the ECP/GR Secretariat **by 31 October 2000** and published on the ECP/GR Internet pages.

Session 3. Methodologies for the conservation of traditional varieties involving farmers and local communities

Chairs: Zdenek Stehno and Massimo Angelini

A strategy for rescuing traditional cultivars, actively involving local communities, was presented. The strategy gives value to the local products of landraces, assuring a higher-quality product through organic cultivation and stressing the importance of preserving local traditions (including culinary), so that even with a relatively low productivity, landraces can be sold for higher prices, leading to increased profits for farmers.

Recommendations

The following proposals and general recommendations were made:

1. To include in the characterization of landraces and local cultivars, when possible, historical and anthropological knowledge.
   This consideration will be investigated by the working group on descriptors and links with existing crop databases (see Session 5).
2. As a supplement to the survey of ongoing activities prepared by Valeria Negri *et al.*:
   - to identify and study different strategies used to promote and value landraces and local cultivars (attention should be given to traditional farmers' practices, geographical specificity, experiences of local organizations, private collections, organic farming networks, non-organized self-suppliers, etc.). These strategies could be documented, compiled and made accessible via the ECP/GR Internet pages (action included in the workplan of Session 6).
   - to monitor on-farm activities and methodologies used to add value to landraces (action included in the workplan of Session 6).
3. To promote the involvement of multidisciplinary teams, including persons with different roles, knowledge and skills, for the support of on-farm activities, with the aim of developing flexible and locally adaptable methods, involving farmers as main actors of on-farm activities and to add value to landraces.
4. To collect examples of forgotten cultivars (based on historical written sources) as a base for their characterization. Zdenek Stehno and Massimo Angelini, **by March 2001**.
5. To develop a model to establish local or regional historical inventories, based on information collected. Zdenek Stehno and Massimo Angelini, **by June 2001.**

Session 4. The need for descriptors for the documentation of on-farm conservation and management

Chair: Martin Bossard

The discussion clearly indicated that the formal and informal sectors have a different conception of the use of descriptors. The formal sector aims at distinguishing the differences between all the accessions and describing all the characters that may be relevant for their current or future use. On the other hand, the informal sector often aims at describing just the most distinctive and discriminative characters in a user-friendly way.

The formal sector is working mainly with detailed descriptions often based on IPGRI or UPOV descriptors. These descriptors have been developed to describe in great detail a plant in a systematic way. They often use descriptors based on a single choice and on codes. The aim is to fully characterize the accessions and facilitate data exchange, using standardized documentation systems.

The NGOs have a different approach to data collection. They mostly use text-based systems, often with a small set (5-10) of variable descriptors (see Figs. 1 and 2). The aim is to quickly identify a few typical traits which differentiate a specific variety from a similar one or which are unique for this variety. They use descriptors that take into account the variability of landraces and allow for more than one choice to be recorded per descriptor. Ranges of variation are used to define a specific variety, thereby ensuring a close description of its typical characteristics. Specific and unique descriptors can be used to characterize the varieties of a species. For example, the extraordinary size, specific colour, particular shape of the leaves or the very early maturity will specify the most relevant traits of a tomato variety, compared with another.

Recommendations

The Task Force recommended that, as far as possible, formal and informal organizations would additionally describe their varieties in a "catalogue" way, using short descriptions in a structured text. This information should be added to formal and informal sector databases. The aim is for interested people to have a rapid overview of the varieties to facilitate selection. The description, when possible, should also be recorded in English to facilitate the exchange of information.

The proposition of the Task Force is to add a few text fields to the databases for the description of variety in words. The following information is proposed to be included in the following order: (1) Origin of the material, (2) Short history, (3) Short phenotypic description, (4) Typical uses, (5) Specialities.

Further recommendations

- Formal and informal organizations to participate in the development and processing of such descriptors, leading to a greater acceptance and utilization of germplasm.
- A minimum number of descriptors should be agreed for the description of each species, which would give an overview of a variety/cultivar. A general recommendation is that such a list would not exceed 10 descriptors.
- The possibility to make more than one choice per descriptor would be preferable to allow the description of the variability, e.g. of landraces/populations.
- In order to provide an overview of European formal and informal databases, it would be helpful to have a short review (inventory) of the existing GO and NGO databases, which would be published and linked on the Internet.

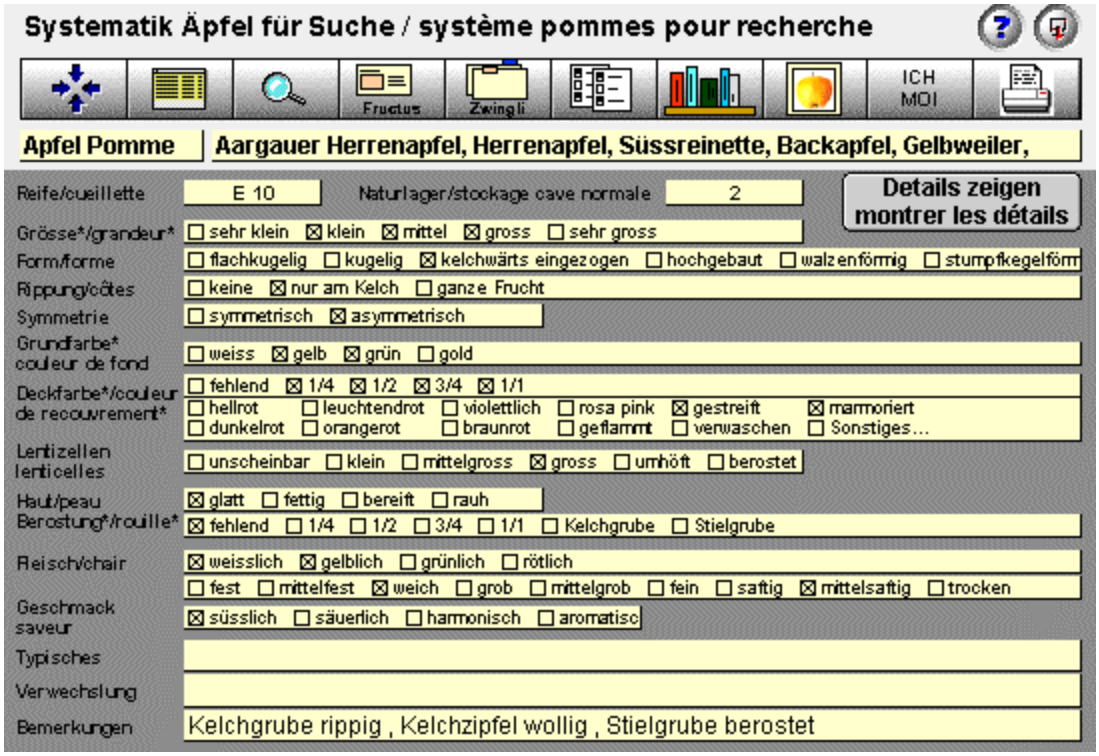

Fig. 1. Example of description allowing for more than choice (Pro Specie Rara fruit database).

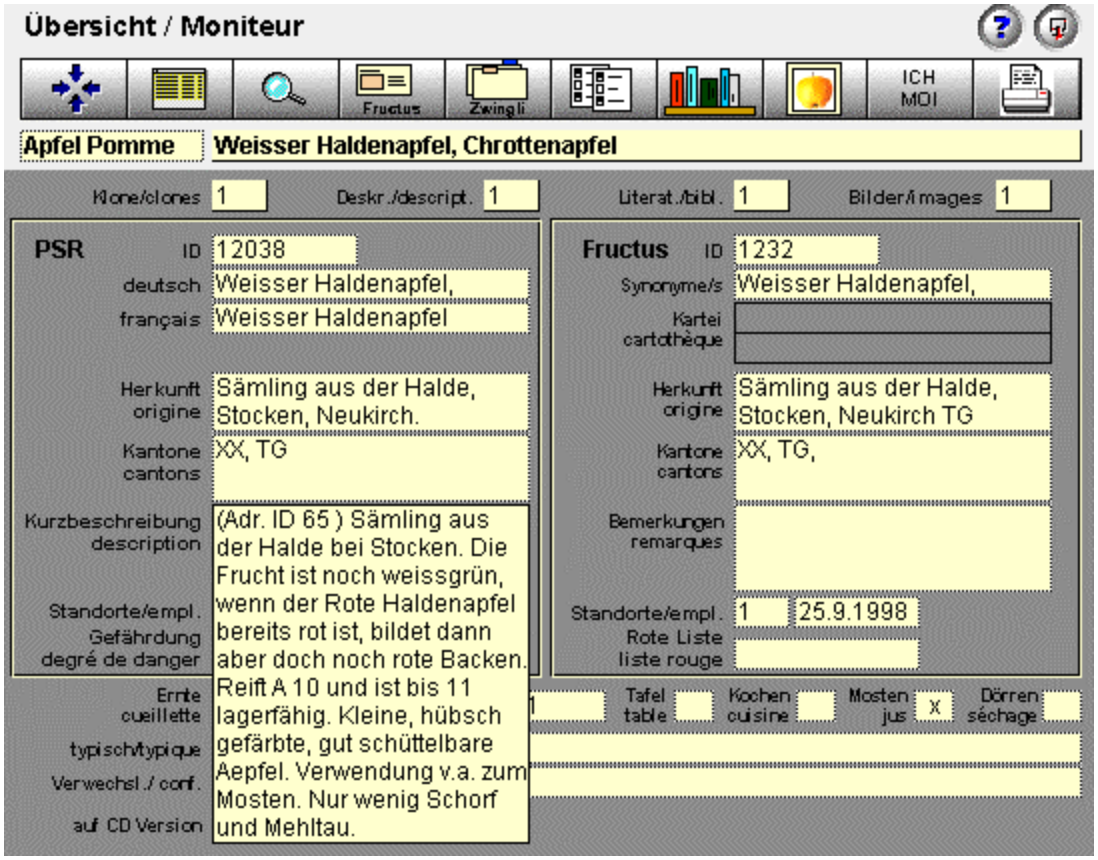

Fig. 2. Example of existing short descriptions (Pro Specie Rara fruit database).

Discussions during the plenary session raised concerns over the introduction of additional text descriptors, considering that existing descriptors used in the European Central Crop Databases (ECCDBs) and the IPGRI descriptors already provide sufficient information (i.e. descriptors on "Country of origin", "Plant use", "Pedigree"). Provisions allowing for more than one choice per descriptor have been made for many descriptors from the IPGRI lists of crop descriptors. However, it is acknowledged that the description of variable populations is a challenge even for the existing descriptors that aim at taking this variability into account, such as the IPGRI descriptors.

Workplan

A subgroup including Janko Rode, Martin Bossard, Wieslaw Podyma and Bert Visser will create a forum between formal and informal sectors on the use of descriptors. The dialogue by email, coordinated by J. Rode, should look at improving the compatibility between the formal and informal databases, keeping in mind the needs of a wide range of users. The subgroup is expected to report on progress made to the Chair of the On-farm Task Force **by December 2001**.

The subgroup is welcome to involve other ECP/GR Documentation experts in the discussion (i.e. the Internet Advisory Group). The following objectives would be brought to the subgroup's attention:

- Provision and use of conversion tables (from codes to text)
- Opportunity to adopt descriptors summarizing the main characteristics of given accessions and their history
- Development of descriptors for variable landraces and populations
- Review of existing GO and NGO databases.

Session 5. Proposals for the inclusion into European crop databases of data derived from farmer's knowledge and on-farm management

Chair: Janko Rode

The Task Force agreed on the importance for the European crop databases of providing links to databases of farmers' knowledge and other information related to germplasm held in the genebanks. It was noted that a few genebanks, e.g. in Romania, in Poland, and the Nordic Gene Bank, already include farmers' knowledge information in their documentation systems as a regular practice.

Recommendations

- Regarding data-gathering methodology and development of databases, the Task Force agreed on the following general recommendations:
- Collect as much information as possible (written documents, photos, videos, Geographic Information System data, soil samples, etc.)
- Agree on a standardized set of farmer's knowledge data descriptors
- Involve specialists from different fields (anthropologist, linguist, etc.) in the evaluation and analysis of collected data
- Allow for a continuous update of the farmers' knowledge databases
- Ensure feedback of information to the contributing communities
- Establish links from crop databases to farmer's knowledge databases.

The Task Force acknowledged that further research would be needed to develop recommendations on the appropriate mechanisms for the inclusion of farmers' knowledge data into documentation systems.

As a first step, the Task Force recommended a compilation of information on the mechanisms currently adopted in different systems (genebanks, NGOs and others). Janko Rode and Martin Bossard agreed to collect existing information and make it available to the Task Force **by October 2000**.

On the basis of this information, a subgroup composed of Janko Rode (coordinator), Martin Bossard, Wieslaw Podyma and Bert Visser agreed to work toward the solution of the issues listed below, in consultation with experts from the ECP/GR Documentation and Information Network. The subgroup is expected to report about its progress to the chair of the On-farm Task Force **by December 2001**.

- Analyze the relevance of the data
- Suggest a list of standard descriptors
- Propose an appropriate documentation system for data received as a feedback from farmers using genebanks' seed
- Analyze the problem of reproducibility and retrievability of the data
- Suggest mechanisms to link relevant farmers' knowledge databases (including the information deriving from the IPGRI *In situ* Global Project and databases on medicinal and wild plants)
- Suggest a mechanism to link European crop databases with existing farmer's knowledge databases.

Session 6. Mechanisms for improving relations between formal and informal sector institutions

Chairs: Petter Marum and Martin Bossard

The Group agreed that improvement of collaboration between the informal and formal sectors is an essential element for the fruitful operation of the On-farm Conservation and Management Task Force of the ECP/GR *In situ* and On-farm Conservation Network.

Recommendations

- The following general recommendations were agreed:
- Individual ECP/GR member states are encouraged to establish joint formal/informal working groups
- The European Commission and ECP/GR member states are encouraged to identify and eliminate existing legal restrictions to the use, exchange and trade of landraces and old cultivars
- National Programmes are encouraged to involve the participation of NGOs in the implementation of their national plans of action and to facilitate access to national and international funds
- Participation of NGO representatives as members, observers or resource persons in the ECP/GR Steering Committee, Working Groups and Task Forces should be enhanced
- The ECP/GR Documentation and Information Network should include in the agenda of its next meeting an item related to the descriptors for the exchange of data between the formal and informal germplasm collections.

General workplan

- A subgroup on "seed legislation", including representatives from formal and informal sectors, is to be established (see specific workplan of Session 2).
- The inventory of on-farm conservation and management activities compiled by Valeria Negri *et al.* will be supplemented with additional information from GO and

NGO activities, and the document will be published on the ECP/GR Internet pages.
- The document will be prepared jointly with NGOs and the costs will be partially covered from available ECP/GR funds (US$ 5000), provided that Steering Committee approval is granted.

The following items should be included in the final document, to be completed **by end of December 2001**:
- A catalogue of possible joint formal/informal actions (based on information collected for the inventory of on-farm conservation and management activities)
- A concept paper on methodologies for the conservation of traditional varieties, as discussed in Session 3 (M. Angelini, Z. Stehno, the Nordic Genebank) including methodologies based on:
  - traditions (e.g. from M. Angelini)
  - geography (e.g. territory products systems)
  - seed libraries, Botanical Gardens Indices semina, seed bank catalogues and other seed exchange systems in Europe (e.g. Henry Doubleday Research Association, Pro Specie Rara, Arche Noah)
  - coordinated private collections (e.g. Pro Specie Rara orchards and its "heritage vineyards")
  - small breeding company methodologies
  - organic breeding networks
  - non-organized self-supplier systems
- Inventory of existing informal databases
- Relevant bibliographies.

By October 2000, a concept note for the implementation of the tasks described above and including proposed partners and cost estimate breakdown, will be provided to the ECP/GR Secretariat by M. Bossard, in agreement with the Task Force, for submission to the Steering Committee.

Proposal for an ECP/GR pilot study of on-farm activities in Romania

A proposal for a pilot study was presented by Wieslaw Podyma to the Task Forces members. The Task Force on On-Farm Conservation and Management considered some regions of Romania as key areas for on-farm conservation and management in Europe based on the following criteria:
- Geographical features (Carpathian Mountains)
- Ethnobotanical reasons (path of migration of plants and people)
- Present concentration of local varieties from all groups of crops and presence of endangered species (e.g. *Triticum monococcum*)
- Ongoing activities of inventorying local populations and knowledge
- Documented ongoing genetic erosion.

Under the guidance of S. Strajeru, the Task Force will facilitate implementation of on-farm conservation and management by the:
- Preparation of a programme (plan of action) for the regions based on current experience
- Monitoring of implementation
- Development of guidelines
- Continuation of inventories
- Cooperation between formal and informal sectors at the European level
- Establishment of a platform for discussion regarding plan of action at national level.

Pending approval by the ECP/GR Steering Committee, it was recommended that approx. US$ 5000 from available ECP/GR funds be used for the following activities:

1. Measuring the genetic diversity conserved
2. Studying the process including socioeconomic reasons for conservation and management.

Five target crops were proposed for study in this project: *Triticum aestivum, Triticum monococcum, Zea mays, Phaseolus vulgaris* and *Cannabis sativa.*

The project could be implemented in three different sites: Depresiunea Radauti - Obcina Brodinei (Bucovina), Valea Izei (Maramures) and Depresiunea Brad - Halmagiu (Apuseni Mountains).

Silvia Strajeru agreed to formulate a draft proposal following this request, based on the discussions during the meeting.

Wild Species Conservation in Genetic Reserves Task Force

Participants: Y. Anikster, M. Gustaffson, J. Iriondo, I. Hjalmarsson, N. Maxted, V. Meglič, S. Samaras, R. Wingender, B. Laliberté, L. Maggioni and J. Turok.

Introduction

The following section reports on discussions during sessions on various subjects connected with the conservation of wild species in genetic reserves. Each session resulted in a list of conclusion and recommendations. For each activity recommended, the name of the coordinator and the time scale for the activities is specified.

Session 1. Inventory of genetic reserve conservation projects of PGRFA in Europe

Chair: Nigel Maxted

Conclusion

It was decided that the title *In Situ* Task Force was misleading and inappropriate for the Group and after much discussion of an appropriate name it was agreed to rename the Task Force as the "Wild Species Conservation in Genetic Reserves Task Force".

The preliminary survey of existing genetic reserves in Europe was useful but not comprehensive. There is a need to re-survey interested parties to obtain a more comprehensive list. To avoid confusion over what constitutes a genetic reserve, potential information providers will be given a definition of a genetic reserve and will be asked to complete an 18-point questionnaire for each reserve (see questionnaire in Appendix III).

In several countries it is difficult to identify the agency and the person responsible within that agency for *in situ* conservation of PGRFA, thus making it difficult to promote genetic reserves or on-farm conservation within each country.

Recommendations

- Short term: circulate a questionnaire within the *In situ* Network members during the meeting and revise the presentation for inclusion in the workshop publication (**Nigel Maxted / 3 days**)
- Longer term: circulate the questionnaire more broadly to all European countries via various newsletters and networks (**December 2000**); these will include:
  - IPGRI Regional Newsletter for Europe (**IPGRI and ECP/GR Secretariat**)
  - Optima Newsletter, Spain (**José Iriondo**)
  - ECP/GR National Coordinators (**ECP/GR Secretariat**)
  - CBD-CHM focal points (**ECP/GR Secretariat**)
  - European Environmental Agency, Denmark (**ECP/GR Secretariat**)
  - SAVE (**ECP/GR Secretariat**)
  - Other NGOs where possible (**ECP/GR Secretariat**).
- Collate and analyze information on wild species conserved in genetic reserves in Europe. Publication of the information via the ECP/GR Web site (**Nigel Maxted / June 2001**).
- When ECP/GR National Coordinators are contacted for the details concerning genetic reserves in their countries, they should also be asked to clarify which agency and who is the named person responsible within that agency for *in situ* conservation of PGRFA in their country (**ECP/GR Secretariat**).

Session 2. Preliminary list of priority target species for in situ *conservation*

Chair: Martine Mitteau

Conclusion

There was much discussion about the purpose of producing a list of priority target species for genetic reserve conservation, how the list would be used and how many species should be included. It was also recognized that a list in this context could be disadvantageous, as excluded species might be considered to have been placed on a 'blacklist' of species unsuitable for genetic reserve conservation. There are already several lists of the PGRFA in Europe (e.g. Heywood and Zohary 1995; IPK and IGR 2000). Therefore, it was decided that it would be better to generate lists as appropriate to suit specific demands.

Recommendation

Maintain a watching brief on the generation of novel lists of PGRFA species in Europe (**Nigel Maxted**).

References

Heywood, V.H. and D. Zohary. 1995. A Catalogue of the Wild Relatives of Cultivated Plants Native to Europe. Flora Mediterranea 5:375-415.

IPK and IGR. 2000. Revised draft list of genera (630) based on "Mansfeld's World Catalogue of Cultivated Plants. IPK, Gatersleben, amended by IGR Bonn.

Session 3. List of guidelines for practical implementation of genetic reserve conservation

Chair: Ruth Wingender

Conclusion

It was recognized that the conservation of weeds is an important aspect of PGRFA conservation that is often overlooked. It was felt that by definition, weeds could not be conserved as such in genetic reserves, weeds being defined as plants growing where they are not wanted. Therefore, the responsibility for their conservation should be passed on to the On-farm Conservation and Management Task Force. However, the same species might be conserved in genetic reserves but then they would be regarded as target taxa and so not strictly as weeds.

It was recognized that there are several existing published sets of guidelines for the establishment and management of genetic reserves (Gadgil *et al.* 1996; Maxted *et al.* 1997; Safriel 1997; Safriel *et al.* 1997) and numerous other unpublished methodologies have been applied. The compilation of these methodologies would be useful for those considering the establishment of future genetic reserves in Europe.

References

Gadgil, M., S. Niwas Singh, H. Nagendra and M.D.S. Chandran. 1996. *In situ* conservation of wild relatives of cultivated plants: guiding principles and a case study. Food and Agriculture Organization of the United Nations, Rome, Italy.

Maxted, N., J.G. Hawkes, B.V. Ford-Lloyd and J.T. Williams. 1997. A practical model for *in situ* genetic conservation. Pp. 339-367 *in* Plant genetic conservation: the *in situ* approach (N. Maxted, B.V. Ford-Lloyd and J.G. Hawkes, eds.). Chapman and Hall, London.

Safriel, U.N. 1997. The role of the protected area manager. Bocconea 7:249-259.

Safriel, U.N., Y. Anikster and M. Valdman. 1997. Management of nature reserves for conservation of wild relatives and the significance of marginal populations. Bocconea

7:233-239.

It was suggested that any novel genetic reserves established as a result of the Task Force's activities should incorporate an element of experimentation with the existing guidelines to assist with the development of generalized methodologies.

Recommendations

The On-farm Conservation and Management Task Force is asked to consider the conservation of wild and weedy species along with the traditional varieties of crops in on-farm conservation projects (**Nigel Maxted / request made during the workshop**).

An inventory of existing guidelines for the establishment and management of genetic reserves for the conservation of wild PGRFA species should be compiled. The information should be published via the ECP/GR Internet pages (**Ruth Wingender / September 2000**).

Once the list of existing genetic reserves in Europe is available (see Session 1), an attempt will be made to elucidate the establishment and management methodologies used. The information will be published via the ECP/GR Internet page or printed guidelines by IPGRI (**Nigel Maxted and Ruth Wingender / May 2001**).

Novel genetic reserves should be encouraged to incorporate an element of experimentation with establishment and management guidelines (**All).**

Session 4. Identification of research elements to study genetic diversity

Chair: Vladimir Meglič

Conclusion

After much discussion it was agreed that there are no general recommendations for general research initiatives as all aspects are species dependent. For example, methods of site selection, population size, management, monitoring and data analysis will vary depending on the target taxon characteristics, organization undertaking the conservation, country, etc. However, it is important to stress that there are extensive research questions to be addressed, but these will be specific in nature and often tied to individual target taxa or individual genetic reserve projects.

It was recognized that there is already an extensive literature and research impetus in the field of ecosystem/habitat conservation and much of their findings would be applicable to genetic reserve conservation of wild PGRFA species. However, it is important to realize when interpreting the research findings from ecological conservation, that genetic conservationists place a greater emphasis on conserving genetic diversity. Assessing genetic diversity (via morphometric or molecular techniques) is the ultimate goal of all PGRFA conservation, whether in a genetic reserve or using a complementary technique. There is a need to establish explicit links to the utilization of conserved diversity.

One of the most difficult aspects of establishing a genetic reserve is enacting the most appropriate management interventions at a site. It is recognized that mathematical modelling systems may prove useful in planning experimental management interventions and thus avoid any inadvertent population or genetic diversity loss.

Recommendations

- The compilation of a bibliography of research papers related to the genetic reserve conservation of wild PGRFA species. Publication of the information via the

ECP/GR Internet pages (**Vladimir Meglič / December 2000**).

- The compilation of a bibliography of research papers related to mathematical modelling systems for predicting changes as a result of genetic reserve management interventions. Publication of the information via the ECP/GR Internet pages (**José Iriondo / September 2000**).
- The various products of the Task Force (listed above) should be collated and published by IPGRI, as they have much wider relevance than to just the Task Force members within Europe (**Nigel Maxted + All / December 2002**).

Session 5. Genetic reserve conservation research proposals

Chair: Nigel Maxted

Conclusion

It was stated that the future of the Ammiad genetic reserve in northern Israel, possibly the longest running genetic reserve for PGRFA, was not secure and that the site may be threatened by development. It was agreed that the conservation of wild wheats at the site was highly desirable and that every effort should be made to retain the site in its existing form.

It was agreed that there was a need for two distinct kinds of genetic reserve proposals, a general, strategic, species-comprehensive, as well as individual species-specific proposals. The general strategic proposal would provide the basic foundation and backbone for multiple individual taxon-specific proposals. It was also agreed at this stage to develop two specific genetic reserve proposals. The choice of the target taxa for these proposals should be limited to:

- Species covered by existing ECP/GR working groups
- Species suitable for genetic reserve conservation
- Crops with diverse wild relatives found across Europe
- Crops for which there is already extensive ecogeographic and genetic information on the included taxa.

After discussion of potential alternative taxa, it was agreed to focus the initial species-specific proposals on cereals (wheat, barley and oats) and brassicas, though this initial choice need not preclude the development of projects for other taxa if there was either an urgent requirement or a particularly motivated group of experts. An outline of the three proposals to be developed is summarized below.

Strategic, species-comprehensive proposal

Note: this project proposal was already well advanced prior to the workshop.

Aim

To locate, catalogue and assist in the genetic reserve conservation of PGRFA species of Europe.

Methodology

Literature-based ecogeographic survey

For each selected priority taxon from the Heywood and Zohary (1995) list, the background ecogeographic data will be collated from the European botanical literature using the established methodology of Maxted *et al.* (1995). This will involve the collation and analysis of the available geographic, ecological, taxonomic and genetic data. The

European flora is the most thoroughly studied in the world and the sources of data are likely to include: European (Tutin *et al.* 1980; Cullen *et al.* 1984-2000) and numerous subregional and national floras, specific revisions/monographs, published articles, grey literature, botanical atlases, floral databases, as well as information from the network of country botanists for each selected target taxa.

References

Cullen, J. *et al.* 1984-2000. The European Garden Flora, Volumes I - V. Cambridge University Press, Cambridge.

Heywood, V.H. and D. Zohary. 1995. A Catalogue of the Wild Relatives of Cultivated Plants Native to Europe. Flora Mediterranea 5:375-415.

Maxted, N., van Slageren, M.W. & Rihan, J. 1995. Ecogeographic surveys. Pp. 255-286 *in* Collecting plant genetic diversity: technical guidelines (L. Guarino, V. Ramanatha Rao and R. Reid, eds.), . CAB International, Wallingford.

Tutin, T.G., V.H. Heywood, N.A. Burges, D.M. Moore, D.H. Valentine, S.M. Walters and D.A. Webb. 1980. Flora Europaea. Vol. 5. Cambridge Univ. Press.

Ecogeographic database

When the literature-based ecogeographic survey is completed, it will be possible to generate an ecogeographic statement for each target taxon. This synthesized report for each species will be held in a database and used to indicate the ecogeographic niche occupied by the target taxa and assist in locating target taxon populations.

Ecogeographic/conservation area matching

Ecogeographic studies may be used to indicate the broad area of geographical and ecological distribution of a species. This information may then be matched against the existing network of national parks and protected areas in Europe (IUCN 1994) using geographical information systems. The European network of protected areas is already held by WCMC in ArcView format. The result of this matching will be a predicted list of occurrence of the socioeconomically important native plant species to be found in the existing protected areas throughout Europe.

Field verification

Individual predicted lists of socioeconomically important native plant species for each protected area will be sent to individual national park and protected area managers for population verification/amendment and a revised taxon list for each protected area generated.

Recommendation of target taxon population management plans

Once the revised list of socioeconomically important taxa present in each reserve is known, we can more efficiently plan their conservation. One of the key necessities for active, long-term *in situ* conservation is an appropriate management plan. The information amassed during the ecogeographic survey on the specific habitat requirements of each species will be used to generate individual site management plans for each protected area. In many cases the protected areas are likely to contain more than one socioeconomically important target taxon per site and therefore the management plan will need to attempt to balance conflicting and complementary interests. The site management plans will be supplied to the protected area managers to raise their awareness of the PGR importance of the species found in their reserves and assist them in their management of the target taxa. Although the taxa may have been selected initially on the basis of their socioeconomic importance, they also have undoubted importance as genetic resources for the indirect agricultural uses as well, such as recreation, agrotourism, national culture, etc. Thus when formulating

management plans, consideration of a taxon's use in the European plant industry, as well as other potential uses will be considered.

Products

Enhanced *in situ* conservation of socioeconomically important European flora
The location and cataloguing of the socioeconomically important native plant species of Europe held in protected areas will greatly facilitate their future conservation.

Provision of individual reserve management advice
The management advice given to individual reserve managers will help them improve the efficiency of the management regimes they employ for the benefit of European socioeconomically important native plant species.

***In situ* conservation gap analysis**
The detailed location and cataloguing of the socioeconomically important native plant species of Europe found *in situ* will enable better judgements to be made about the genepool conservation coverage of these taxa by *in situ* techniques. The project output will highlight segments of the genepool not currently conserved, 'gaps' that subsequently can be filled by targeted conservation actions. Similarly the results of this analysis may prove useful in identifying germplasm not currently conserved using *ex situ* techniques.

Enhanced exploitation of socioeconomically important European flora
The detailed location and cataloguing of the socioeconomically important native plant species of Europe will ensure better access for future exploitation in the Europe.

An exemplar *in situ* conservation methodology for the European flora
The detailed location and cataloguing of the socioeconomically important native plant species of Europe will provide a working example of how the remaining European flora might better be actively conserved using *in situ* techniques.

Species-specific Cereal Project Proposal
It was agreed that there is a need to develop a project focused on genetic reserve conservation of wild wheat, barley and oats in Europe.

Species-specific *Brassica* Project Proposal
It was agreed that there is a need to develop a project focused on genetic reserve conservation of wild *Brassica* species in Europe.

Recommendations

- **Ammiad genetic reserve**
  IPGRI will write formally to the appropriate authorities in Israel (i.e. the Ministry of Science) and stress to them the importance of maintaining this reserve for wild wheat conservation, as well as the need to continue the established long-term research programme at the site (**IPGRI and ECP/GR Secretariat / June 2000**).
- **Strategic, species-comprehensive proposal**
  - Revise project document in the light of discussion at the workshop (**Nigel Maxted / September 2000**).
  - Identify additional project partners to the members of the genetic reserve Task Force drawn as broadly as possible from throughout Europe, but partners must be interested in genetic conservation and PGRFA (**ECP/GR Secretariat and Nigel Maxted / September 2000**).

- Arrange a visit to the European Commission in Brussels to investigate sources of EU funding for the project (**Nigel Maxted and ECP/GR Secretariat / September 2000**).
- Investigate non-EU sources of funding for the project (**IPGRI and ECP/GR Secretariat / September 2000).**

- **Species-specific Cereal Project Proposal**
  - Write project document for genetic reserve conservation of wild wheat, barley and oats in Europe (**Yehoshua Anikster and Nigel Maxted / December 2000**).
  - Investigate potential European project partners (**Yehoshua Anikster / September 2000**).
  - Collate existing ecogeographic and genetic information (**Yehoshua Anikster and partners / December 2000**).
  - Investigate possible sources of project funding (**IPGRI and ECP/GR Secretariat / September 2000**).
- **Species-specific Brassica Project Proposal**
  - Write project document for genetic reserve conservation of wild brassicas in Europe (**Mats Gustafsson and Nigel Maxted / December 2000**).
  - Investigate potential European project partners (**Mats Gustafsson / September 2000**).
  - Collate existing ecogeographic and genetic information (**Mats Gustafsson and partners / December 2000**).
  - Investigate sources of project funding (**IPGRI and ECP/GR Secretariat / September 2000**).

Note: For potential ease of seeking funding, the two species-specific project proposals will be written in a modular form along with the genetic reserve methodology. The latter will be written by N. Maxted. This will permit all three modules to be combined for one funding agency, as well as either species-specific module to be combined with genetic reserve methodology for another funding agency.

Selection of the Task Forces' Chairs and closing remarks

The two Task Forces selected as their Chairpersons Valeria Negri for the On-farm Conservation and Management Task Force and Nigel Maxted for the Wild Species in Genetic Reserves Conservation Task Force.

The following closing recommendations were agreed:

- The Task Forces should reconvene in two years. Funding for such a meeting will be incorporated into any funding application made by members of the Group (**All / December 2002**).
- A listserver should be established for the *In situ* and On-farm Conservation Network to encourage discussion on genetic reserve and on-farm issues **(IPGRI and ECP/GR Secretariat / September 2000**).

Part II of this report (Discussion and Recommendations) was presented in a plenary session and discussed by both Task Forces. This document was subsequently revised and circulated to all participants for comments. The version published here has been approved by both Task Forces.

The collaboration of Istituto di Miglioramento Genetico Vegetale, University of Perugia and Provincia di Perugia for the organization of this workshop is gratefully acknowledged.

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Appendix II. Terms of Reference for the ECP/GR *In situ* and On-farm Conservation Task Forces

Background

With the purpose of meeting the recommendations from the Braunschweig Symposium in 1998 regarding *in situ* and on-farm conservation, the ECP/GR Steering Committee, during its seventh meeting in 1998, recommended that two task forces be established within the framework of the ECP/GR *In situ* / On-farm Conservation Network, for Phase VI.

Purpose of the Task Forces

The ECP/GR *In situ* / On-farm Conservation Network Task Forces (TF) will aim to:

- Bring together and enhance collaboration between the different European partners involved in *In situ* / On-farm Conservation
- Identify priorities for *In situ* / On-farm Conservation in Europe
- Enhance joint fund raising efforts for *In situ* / On-farm Conservation in Europe
- Ensure that the agreed workplan is carried out for the period 2000-2003.

Members of the Task Force

The members of the ECP/GR *In situ* and On-farm Conservation Network Task Forces are nominated by the ECP/GR National Coordinators in consultation with the ECP/GR Secretariat. It is understood that the structure is flexible. The present Task Forces are made of the following members respectively (for complete contact details see Appendix I).

On-farm Conservation and Management Task Force members

Mr Massimo Angelini
Mr Heiko Becker
Mr Martin Bossard
Mr Paul Freudenthaler
Mr Geert Kleijer
Ms Martine Mitteau
Ms Valeria Negri, Italy
Ms Johanna Onnela
Mr Wieslaw Podyma
Mr Janko Rode
Mr Juan José Ruiz Martínez
Mr Nigel Maxted
Ms Alisea Sartori
Mr Nikolaos Stavropoulos
Mr Zdenek Stehno
Ms Silvia Strajeru
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Mr Bert Visser

Wild Species Conservation in Genetic Reserves Task Force members

Mr Yehoshua Anikster
Mr Mats Gustafsson
Ms Inger Hjalmarsson
Mr José Iriondo
Mr Nigel Maxted
Mr Vladimir Meglic
Ms Martine Mitteau
Ms Valeria Negri
Ms Nathalia Rybianets
Mr Stelios Samaras
Mr Zdenek Stehno
Ms Ruth Wingender

Mode of operation of the Task Forces

The activities of the ECP/GR *In situ* / On-farm Conservation Network Task Forces will be led by a Chair for each Task Force selected by the members. The implementation of the Network activities will be through participants of the Task Force and other resource persons or institutions mobilized by the Task Force members. The Task Force members will:

- Set priorities for *In situ* / On-farm Conservation
- Carry out the agreed workplan in consultation with the ECP/GR Steering Committee and with their own resources as input in kind to the Network
- Regularly exchange information between them
- Continuously review progress, achievements and future work plans of the Network
- Submit proposals to the Secretariat for *ad hoc* activities of the Task Force
- Assist in finding sources of funding of proposed actions
- Ensure effective links with the ECP/GR Crop and Thematic Networks
- Interact with other regional networks
- Contribute to raising public awareness.

Appendix III. Survey of Wild Species Conservation in Genetic Reserves

The Wild Species Conservation in Genetic Reserves Task Force of the European Cooperative Programme for Genetic Resources (ECP/GR) is undertaking a survey of current reserves where the genetic diversity of plant genetic resources for food and agriculture (PGRFA) are conserved. The objective is to identify geographical and technical gaps in the current reserve network and so identify existing and novel sites that require increased support as well as future research objectives.

To avoid confusion of what constitutes a reserve for wild species conservation, genetic reserve conservation is defined as:

> "the location, management and monitoring of genetic diversity in natural wild populations within defined areas designated for active, long-term conservation".

Therefore, to be considered a genetic reserve the following two criteria must be met:

a. the population of the target taxon must be actively managed to promote the long-term health of the population, and
b. the target taxon population at the site must be monitored, either in terms of population density or of genetic diversity.

If you are responsible for a genetic reserve in which PGRFA taxa are conserved, could you please complete the questionnaire below as fully as possible [2]

Reserve Details

Target species: _____

Location: Country: _____ Province: _____

Settlement: _____ Land area: _____ ha

Latitude: _____ N Longitude: _____ W/E Altitude: _____ m

Organization managing site: _____ Key Personnel: _____

Land ownership (e.g. public / private / other): _____ Financial support (e.g. public / private / other): _____

Reason(s) for establishment: _____

Management interventions: _____

Monitoring procedures: _____

Involvement of local people: _____

Users of reserve: 1 _____ 2 _____ 3 _____ 4 _____

Link to *ex situ* conservation: _____

Access policy for diversity: _____

Breeder's evaluation? _____ Molecular evaluation? _____

[2] Please return the form to Chair of the ECP/GR Wild Species Conservation in Genetic Reserve Task Force, Nigel Maxted, School of Biological Sciences, University of Birmingham, Birmingham B15 2TT, UK. Fax work: (44) 121 414 5463. Email work: N.Maxted@bham.ac.uk or Nigel.Maxted@dial.pipex.com

Appendix IV. Acronyms

ARSIA	Agenzia Regionale per lo Sviluppo e l'Innovazione nel Settore Agricolo
ASSAM	Agenzia Settore Agroalimentare delle Marche
ASSINSEL	International Association of Plant Breeders
BRG	Bureau des Ressources Génétiques, France
CBD	Convention on Biological Diversity
CBD-CHM	Clearing-House Mechanism of the CBD
DBCPGR	Centre for Agronomic Research of the Ministry of Agriculture, Belgium
DUS	Distinct, Uniform, Stable characteristics for plant varieties
ECCDB	European Central Crop Databases
ECP/GR	European Cooperative Programmes for Crop Genetic Resources Networks
ERSA	Ente Regionale per lo Sviluppo Agricolo
EU	European Union
EUFORGEN	European Forest Genetic Resources Programme
FAO	Food and Agricultural Organization of the United Nations
GEF	Global Environment Facility
GIS	Geographical Information System
GPA	FAO Global Plan of Action
HDRA	Henry Doubleday Research Association, UK
HSL	Heritage Seed Library, UK
IFAD	International Fund for Agricultural Development
INIBAP	International Network for the Improvement of Banana and Plantain, France
IPGRI	International Plant Genetic Resources Institute, Italy
IUCN	World Conservation Union
KTTK	The Finnish Production Inspection Centre
MAB	Man and the Biosphere of UNESCO
NGB	Nordic Gene Bank, Sweden
NGOs	Non-Governmental Organizations
NIS	Newly Independent States
PGR	Plant Genetic Resources
PGRFA	Plant Genetic Resources for Food and Agriculture
PSR	Pro Specie Rara, Switzerland
SAVE	Safeguard for Agricultural Varieties in Europe
SeSIRCA	Settore Sperimentazione, Informazione, Ricerca e Consulenza in Agricoltura della Regione Campania, Italy
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UPOV	International Union for the Protection of New Varieties of Plants
VERN	Verein zur Erhaltung und Rekultivierung von Nutzpflanzen in Brandenburg e.V., Germany
WCMC	World Conservation Monitoring Centre, UK