

Guide to collecting native seeds

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What are the reasons for collecting germplasm?

- danger of genetic erosion/extinction
- needed for immediate use (for special breeding purposes)
- fill gaps in *ex situ* collections
- recollection
- ecological studies
- research purposes

Collecting is only part of a conservation strategy.

What are the terms for a successful collecting mission?

- Planning

Planning is essential to the success of all germplasm - collecting missions.

- Flexibility

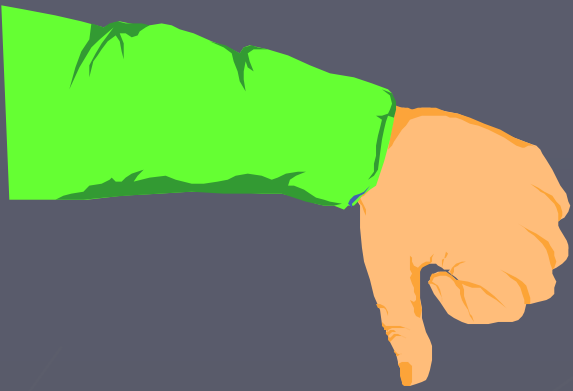
- Involvement of local people who have extensive eco - geographic and cultural knowledge.

Planning a seed collecting missions

- Logistical planning
- Technical planning



Logistical planning



- To ascertain the optimum timing for collecting
- To establish:
 - ✓ collecting proposal
 - ✓ partners in collecting
 - ✓ collecting team
 - ✓ itinerary
 - ✓ duration
 - ✓ transport
 - ✓ equipment
 - ✓ permits
- To assemble the documentation it will be necessary or useful to take in the field.

Collecting proposal

The type of collecting mission depends on the purpose of the mission and the strategy used to collect the germplasm.

Purpose: - multi - species or specific species

Strategy: - single visit or multiple visit (because of variation in timing of fruiting, year to year variation, exploration, genetic erosion)

Multi - species collecting (for conservation purposes):

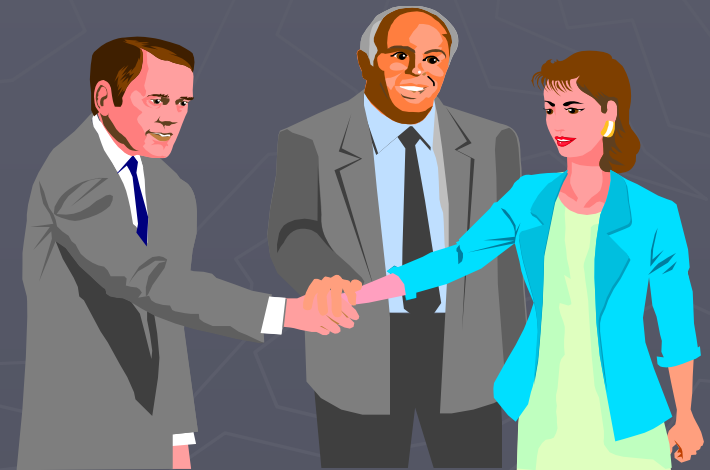
- ▶ Problems
- ✓ Difficult to optimize sampling strategy
- ✓ Problems of incomplete knowledge
- ✓ Differences in maturation times
- ✓ Different collecting techniques required

Specific species collecting (for breeders)

- Less complicated to plan
- More known about distribution of target material
- Collecting team usually more familiar with target species

Partners in collecting

- ▶ Regionally agricultural stations
- ▶ Universities and colleges
- ▶ Non - governmental organizations (NGOs)
- ▶ Local communities



The collecting team

- Team leader
He ensure that everything is going to plan.
- Specialists (preferable 3 persons)
- Driver



The itinerary and duration

Itinerary

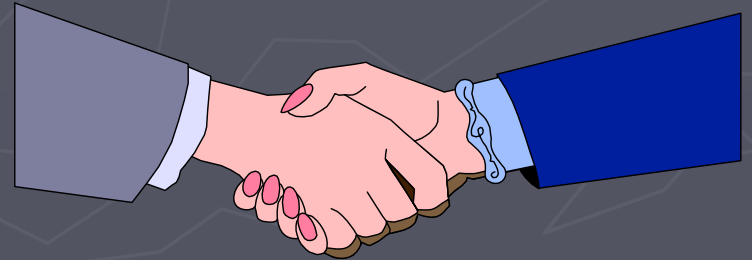
- A list of target areas
- The most accessible route

Duration is limited by:

- Cost
- Need to process germplasm

Transport, equipment and permits

- Transport it must be organized very well in advance of the mission
- Equipment : knapsacks, plastic and paper bags, field notebooks, markers, GPS, laptop, digital camera and interview camera, maps, medical supplies, other tools (collecting forms)
- We must obtain permission before collecting from local farmers or local authorities



What are the basic principles for a seed collecting mission?

- To sample at random covering the whole habitat (locality) by capturing the widest possible genetic diversity from all species
- To sample sufficient seeds
- It's important to focus on the target species and to ensure that it is a good germplasm for conservation
- Collectors should be careful not to mix species when making a collecting
- The collecting must be done in warming days, not in raining days (collecting dry seeds)
- It's important to look up at the elevation, soil type, slope and aspect at the site where we collect samples, because the relevant information are essential
- It's very important to collect species which is endangered with extinction, because these seeds can be a good research material needed for reintroduction and establishment of a self - sustaining population.

Seed collecting techniques

- To ensure a adequate genetic diversity, the seeds are likely to be at maximum possible viability and longevity
- All samples of the collection should be labeled with a unique identifier number, date and the name of the species
- All other data will be recorded on the field data form
- The collections will be stored for long - term conservation, but for distribution it will be available only few seeds.

The main activities in a seed collecting mission

- Assessment of genetic diversity
- Collection of information related to what varieties each farmer grows, where and why the varieties grown
- Collection of information related to traits farmers and use of target crops
- Collecting data on site location
- Recording the regional pedo - climatic conditions
- Investigation of socio - economic aspects by site location
- It's important to improving our specific needs and priorities:
 - specific to our country
 - specific to our most important crops.

Sampling strategies

- ✓ the right time for a seed collection
- ✓ how many sites and which are these targeted areas
- ✓ the list of target species
- ✓ how many households from each village (genetic variability)
- ✓ how many samples from each household
- ✓ how many varieties from each population
- ✓ how many populations from each species
- ✓ how much seeds (the amount) to collect per sample
- ✓ how to choose ripe and vigorous seeds (by the colour, shape, size, health).

What to consider before collecting new seeds

- Sufficient capacity to multiply the germplasm
- Sufficient storing facilities
- Make sure that the collection fit into work plan
- Consult of local farmers
- Consult environmental information

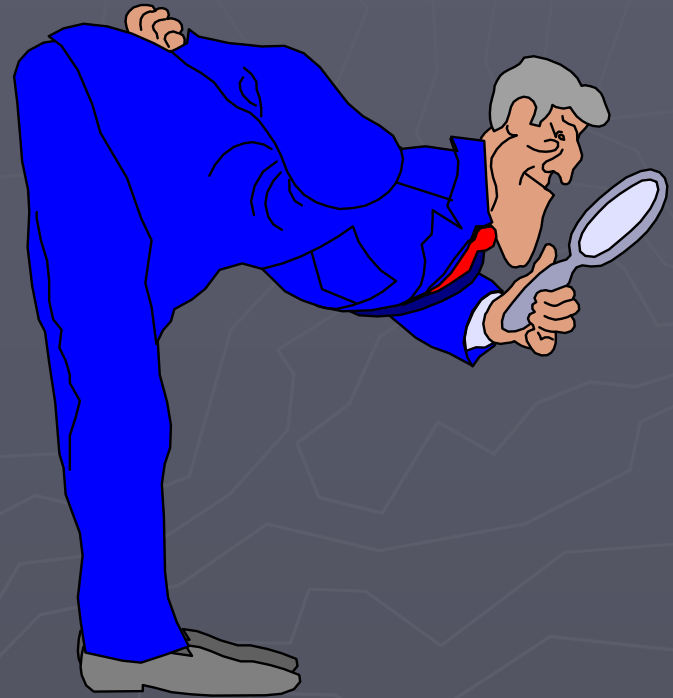
Dangers of collecting

- ✓ Damage to populations and habitats
 - over collecting
 - introduction of pests and diseases
- ✓ Damage caused after collecting
 - movement of contaminated germplasm
 - introduction of competitor species
- ✓ Personal safety



What are the causes of genetic erosion?

- Agricultural changes
- Socioeconomic changes
- Overexploitation for commercial reasons
- Loss of habitat or modifications
- Competitors, predators, pests
- Natural disasters/pollution
- Introduction of modern cultivars
- Limited distribution
- Migration of young people to urban centers



Agricultural changes

Traditional and diverse landraces of the major crop types are seriously threatened with extinction by the introduction of modern varieties.

Socio economic changes

- Rural populations abandon agriculture and move to the cities.

Overexploitation and loss of habitat

- Loss of some traditional species is caused by introduction of new varieties, uniform from genetic point of view, more productive and valuable aesthetically.
- Habitat loss is caused by urban expansion, land clearance, dams, road and railroad construction and overexploitation.

Competitors, predators and pests

Introduction of foreign organisms (plant, insect and microbial species), often through human interference, can have calamitous effects.

Natural disasters/Pollution

- ▶ Drought
- ▶ Floods
- ▶ Disease epidemics
- ▶ Industrial pollution

Is the genetic diversity in danger?

To prevent this is important to:

- Maintaining of inter- and intra- diversity at farmers individual households level
- Maintaining and multiplication of landraces, which are endangered with extinction for utilization them in breeding programs of target species
- Improvement of life quality and ensuring of food security for rural communities from target areas
- Preventing and decreasing of environment pollution by promotion of utilization a system and farming practices traditional

Why some farmers still used landraces in cultivation?

- traditional agriculture
- perfect adaptability of these old varieties to pedo - climatic conditions
- lack of financial resources concerning procurement of new varieties
- isolation of some villages in mountain areas, without car roads access placed between 800 - 1600 m altitude
- ageing population from villages because migration of youth people to towns or abroad



Technical planning

The objective of this course is to provide a basic understanding of the following topics:

- Why collect seeds?
- Who collect?
- What to collect?
- When to collect?
- Where to collect?
- How to collect?
- How much seeds to collect?
- How much it will cost a seeds collecting mission?

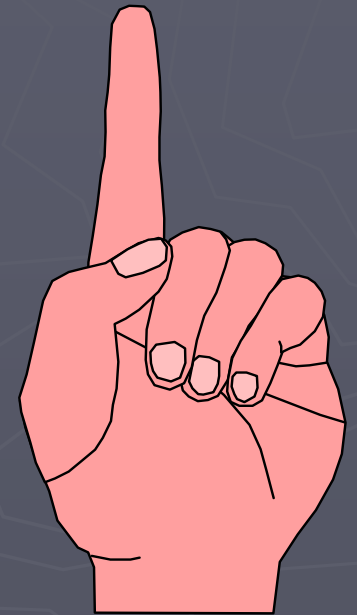
Why save seeds ?

Genebank Suceava provide a controlled source of plant material for research, provide skills and knowledge that support wider plant conservation aims, and contribute to education and public awareness about plant conservation. Our collecting programs can be defined as the establishment of verified and well documented seed collections of plant genetic resources.



Who collect seeds?

The seeds must be collected by collectors, legal persons with experience that can collect plant genetic resources and related information. They have idea about the best target areas, taxonomy of plants, the quality of seeds and which are the steps for a collecting mission.



What to collect?

- Developing a list of target species for collecting
- It's essential to collect local seeds from native plants (adapted to the local soil, climatic, and biotic environments over the course of thousands of years), for maintaining genetic diversity . There are very appreciated from an aesthetic, agricultural, environmental and cultural point of view. Serve as an important genetic resource for future food crops or other plant - derived products.
- Also, it's very important to collect associated data (knowledge about crops, farming systems, cultural aspects of crops and local use of them).





When to collect? (The right time for collecting)

It's essential to collect ripe seeds. It requires the collector to decide when it's the best time for collecting. Seeds often do not ripen uniformly over the different regions.

Crop maturity varies due to factors such as latitude, longitude, altitude and environmental factors.

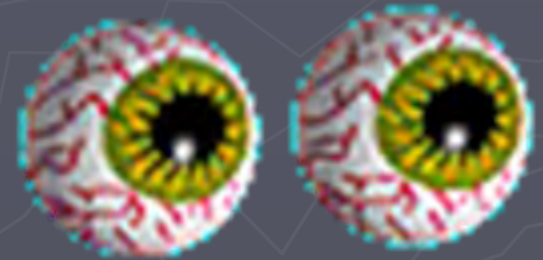
From year to year, seasonal factors may cause variations in ripening times, but in most cases there is an optimum time for collection. Also, the number of seeds produced per plant may vary greatly, and is both genetically and local environmentally controlled. Factors such as rainfall, insects and fungi can modify the cycle of species.

Collecting of species from new locations may require monitoring over more in order to determine the optimum time.

Checking the maturity and vigorous before gathering seeds it's essential to be sure it will be viable. It is important to looking for at least one of these signs: colour, shape, size, health, quality.

Where to collect seeds? (target areas)

Suitable collecting sites should be identified through a combination of local farmers, and some advices from local authorities about the optimum areas with a great genetic diversity.

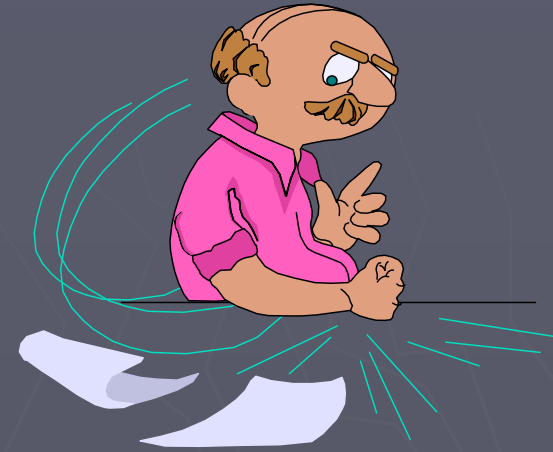


How to collect? (Collecting methods)

The basic strategy is to collect:

- ripe and vigorous seeds
- randomly from different regions
(minimum 5 km between areas)

The collectors can divert from the original itinerary for obtaining more and more interesting diversity of the target species.



How much seeds to collect?

- Conservation
- Germination
- Duplication
- Distribution

It's important to maximize the use of the collection means:

- sufficient seeds for viability testing;
- samples are available for supply to users for reintroduction in cultivation, education or scientific purposes;
- a substantial amount of seed can be conserved as a long term safeguard.

Seeds put in storage must be fully mature and handled with more care.

In the field

- ▶ It is important , once arrive in the field, to establish a daily routine to find collecting sites and to collect there.
- ▶ Local people will also be vital in the more practical aspects of collecting: it is good practice to take every opportunity to ask about the situation ahead (where the road is going, whether it's practicable, accommodation available in the next village) in order to confirm and supplement previously obtained information and to earn some time.
- ▶ Once a collecting site has been identified, it must be described on a collecting form; also, collecting samples are noticed in the form and all details about it.

Care of seed collection

- ▶ Generally, the seed collections should be kept in a cool, dry place
- ▶ Exposure to such sustained high temperatures can badly damage the samples.



Preparing material for transportation

It's essential to label bags and bundles carefully. The identity of each bag of plant material should be established by a collector name or initials and a field collecting number.

How much cost a seed collecting mission?

The cost of collecting is determined by the distance to the seed sources, the number of collectors involved, their productivity (and how much they can collect per day).

The most economical collecting method is that of seeds of good quality which are collected from carefully selected seed sources in well planned collection expeditions, with well trained personnel and under professional supervision.



Recording information

It is essential that all relevant information related to the seed collecting site and samples are recorded at the time of collecting.

The information can either be entered electronically and/or on paper format.

When using electronic format it's essential that a backup copy be made. Relevant information must also be recorded in the "field book".

The base information that is important to record is:

- ▶ name of the species
- ▶ location – from where the seeds was collected (it must include enough details for us to find this site again)
- ▶ collecting data
- ▶ name of collectors

It's vital to record the details of the seeds collected because define and document a collection.

Also, digital photos of the samples being collected should also be made in the field and in storage conditions.

Gathering data in the field

Passport descriptors lists:

➤ Sample labeling

- Collecting organization
- Names of collectors
- Collecting number
- Collecting date
- Origin of sample (name of farm)
- Type of material (seed in our case)

➤ Sample identification

- Genus, species, subspecies, botanical variety (taxon name)
- Vernacular name (locally used name)
- Photographs numbers and subjects
- Status of sample (landraces in our case)

➤ Sampling information

- Sampling method
- Collecting source
- Size estimates of sample (sample area)
- Frequency of the target species in the area (abundance)

➤ Collecting site localization

- Country
- Locality
- Geographical coordinates (latitude, longitude, altitude, map reference, site number, farmer's name of collecting site (village, region))

- Collecting site description (soil type, climate, landform at the site, slope, biotic factors - vegetation type, land use and farming system, dominant landraces)

➤ Species information

- Pests and diseases
- Uses
- Morphological description (botanical description)
- Distribution within the target region
- Threats

On farm descriptors

At the same time with collecting samples of plant genetic resources, in a seed collecting mission it's important to gather:

- information about pedo - climatic conditions of ecological areas, which help us to identify the food plant's biodiversity
- information regarding the landraces/varieties dispersion and the local traditional methods used by the farmers in spreading, keeping, maintenance and utilization of these genetic resources
- usual information about local names
- environmental and ethnographic information
- other useful information

On farm database

On farm ✖

SVGB-239 ; Vicia faba ; FRUMOSU 18 ; ROM - Suceava, Frumosu

Numar de intrare:	<input type="text" value="SVGB-239"/>	Numele donatorului:	<input type="text"/>
Nume popular:	<input type="text" value="Bob"/>	Suprafata cultivata:	<input type="text"/>
Nume local:	<input type="text"/>	Motivul cultivarii:	<input type="text" value="Agrotehnica simpla / usoara"/>
Utilizator:	<input type="text" value="Familia donatorului si vecinii, prietenii"/>	Modul de selectia a semintelor:	<input type="text" value="Marime"/> <input type="text" value="Culoare"/>
Clasa sociala a pastratorului:	<input type="text" value="Mediu"/>	Mod de uscarea a semintelor:	<input type="text" value="Curte"/> <input type="text" value="Sopron"/>
Varsta pastratorului:	<input type="text" value="Batrani > 60 ani"/>	Mod de conservare a semintelor:	<input type="text" value="Seminte"/>
Raspandirea cultivarului:	<input type="text" value="Locala"/>	Mod de pastrare:	<input type="text" value="Pod"/>
Mod de cultivare:	<input type="text" value="Continua"/>	Recipient utilizat:	<input type="text" value="Cutie de carton"/>
Loc de cultura:	<input type="text" value="Gradina"/>	Utilizare:	<input type="text" value="Nutret"/>
Metoda de cultura:	<input type="text" value="Cu alte varietati ale aceleiasi specii"/>	Prelucrare:	<input type="text" value="Altceva"/>
		Rotatie:	<input type="text"/>
Observatii:	<input type="text"/>		

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Post collecting

Once back from collecting mission, collectors will still need to carry out some important tasks:

- ▶ Sorting and preparing germplasm samples
- ▶ Drying and cleaning seeds
- ▶ Collating, completing and editing the collecting data forms
- ▶ Storage the samples in conservation sector
- ▶ Computerization of all the data in our database.

The collecting mission report

The collecting report should include:

- a statement of the objectives of the collecting and the list of target species
- a description of the environment of the target region
- some details about collecting mission (timing, itinerary, sampling strategy and collecting techniques)
- a summary of the results (germplasm collected, number of samples, areas explored).

References

- ▶ Collecting Plant Genetic Diversity - Technical Guidelines, edited by L. Guarino, V. Rao V. R., R. Reid, 1995
- ▶ A Training Guide for *In situ* Conservation *On-farm*, by D. I. Jarvis at all., IPGRI, 2000
- ▶ Genes in the Field - *On Farm* Conservation of Crop Diversity, edited by B. Brush, 1999