

COUNTRY REPORT ON THE STATE OF PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

ROMANIA



**SECOND COUNTRY REPORT ON THE
STATE OF PLANT GENETIC
RESOURCES
FOR FOOD AND AGRICULTURE**

PREPARED BY:

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Note by FAO

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INTRODUCTION

Romania is located in SE of Central Europe, North of the Balkan Peninsula, on the Lower Danube, with exit to the Black Sea and lies between 43°37'07" and 48°15'06" North latitude and 20°15'44" and 29°41'24" East longitude.

Parallel 45°N (midway between the Equator and the North Pole) crosses Romania from 70 km North of its capital, Bucharest, and meridian 25°E (midway between the Atlantic coast and the Urals) runs 90 km West of the same city.

Romania has an area of 238 391 km and is bordered to the North and East with the Republic of Ukraine and the Republic of Moldova, Hungary to the West, South-West with Serbia, Bulgaria to the South and South-East of Black Sea. Two-thirds of the border is covered by rivers (Danube, Prut, Tisa) and a sea (The Black Sea) and one third is drawn on the ground.

1. Relief of Romania

Romania is a country whose relief is varied and harmoniously distributed. There are three major, well-differentiated relief steps: the highest is represented by the Carpathian Mountains, the middle by the Sub-Carpathians, the hills and the tablelands, and the low one by the plains, the river meadows and the Danube Delta. The main characteristic feature of the relief components is their distribution in the form of an amphitheatre.

The mountains stretching in the shape of an arch in the central part cover 31% of the country's area, the hills and the tablelands which descend from them occupy 36%, and the plains, extending towards the southern and western borders, take up 33%.

Romanian seaside of the Black Sea is lying on 245 km, between Musura stream (at the border with Ukraine) and Vama Veche locality (at the border with Bulgaria) and enables the connections with the countries in the Black Sea basin, in the Mediterranean Sea basin and with the rest of the world.

Rivers

The network of rivers is radial-shaped, with 98% of the rivers springing from the Carpathian Mountains and being collected directly or through tributaries by the Danube. The Danube, the second longest river in Europe (2 860 km), flows on Romania's territory along 1 075 km and empties into the Black Sea through three arms (Chilia, Sulina, Sfântu Gheorghe) which form a delta. The main rivers are: the Mures (761 km on Romania's territory), the Prut (742 km on Romania's territory), the Olt (615 km), the Siret (559 km on Romania's territory), the Ialomița (417 km), the Somes (376 km on Romania's territory), the Arges (350 km).

Lakes

There are around 3 500 lakes, but only 0.9% of them have an area exceeding 1 km². More important are the lagoons and the Black Sea coast lakes (Razim 425 km², Sinoie 171 km²), the lakes along the Danube bank (Oltina 25 km²) and the Danube's meadow lakes (Brateș 21 km²).

Glacial lakes are meeting in the Carpathian Mountains. The largest of these is Lake Bucura, with a surface of a 0.105 km). Besides, there are anthropogenic lakes which are important for the energy power that represents. The most important of these are the anthropogenic lakes on the Danube, at Porțile de Fier (700 km), on the Prut, Stanca - Costesti (59 km) and from Izvorul Muntelui - Bicaz (31 km).

Vegetation

The vegetation is determined by the relief and pedo-climate elements, with a steps layout. Mountain regions are covered by coniferous forests, the mixture forest and beech forests. In the hill and plateau regions it can meet lowland evergreen broadleaf forest and steppe and silvosteppe vegetation, which occupies Dobrogea's Plateau, Romanian's Plain, Moldova's Plateau and Banat and Crișana's Plain, was replaced in most by the cereals cultures.



Climate

Romania's climate is temperate-continental of transition, specific for Central Europe, with four clearly defined seasons. Local differences are caused by altitude and by slight oceanic (from the West), Mediterranean (from the South-West) and continental- excessive (from the East) influences.

In winter time the average temperature falls below - 3°C and in summer time it ranges between 22°C and 24°C. The average annual temperature is 11°C in the South and 8°C in the North of the country.

Yearly precipitations decrease in intensity from west to east, from over 600 mm to less 500 mm in the East Romanian Plain, under 450 mm in Dobrogea and about 350 mm by seaside, in the mountainous areas they reach 1 000 - 1 500 mm.

If not considering the water from the Danube, Romania is a poor in water country, water shortages are strong in the territories at high risk of desert and drought.

2. Population and demographic trends

In the year 2005, Romania had a population of 21.62 million inhabitants, with 5.18% less than the number of people registered with the census of 1992, of which 54.9% live in urban areas.

The demographic decline is explained by both a negative natural growth (2005 birth rate is 10.2%, the fertility rate is 1.3 children for a fertile woman and mortality is 12.1%) and by - an important emigration phenomenon. In the year 1990, there were 96 900 registered emigrants, their number gradually decrease up to 10 938 emigrants in 2005.

The population of Romania, constantly declining, is affected by the ageing phenomenon manifesting itself in most of the Member States of the European Union. Since 1990 the segment of population aged up to 14 years entered into decline, while the expansion of the segment aged over 60 years. Thus the year 2005, the percentage of population age (over 60 years) has a higher value by 3.66% than that recorded segment aged up to 14 years. More than half of the number of people aged over 60 years, which is 55.7%, resides in rural areas. Ageing population in rural areas of Romania will enhance the economic differences in terms of regional development, meaning that the population capable of working will prefer to migrate internally to major urban areas.

Ethnic structure of Romania is dominated by ethnic Romanian population (89.5% according to the Census 2002), and the most important ethnic minorities are Hungarians (6.6%), Gipsy population (2.5%), Ukrainians, Germans, Turks and Tartar, Russians, Serbs etc.

Territorial and administrative structure of Romania is made up of 276 cities (of which 103 municipalities) and 2 727 townships. All these are the basic administrative and are grouped in 41 counties. Since 1998, there were established eight development regions by voluntary association, named after geographical position, specific territorial entities, without the administrative status and without legal personality, pursuing the European system of The Nomenclature of Territorial Units for Statistics (NUTS) and the corresponding level NUTS II. More than half of the cities of Romania (62%) are less than 20 000 inhabitants and are very much dependent upon a single economic activity, especially industrial. Only 25 municipalities have more than 100 000 people and only 5 have more than 300 000 inhabitants: Bucharest (1 929 615), Iasi (313 444), Constanta (309 965), Timisoara 308 019), Craiova (300 843) and Galati (300 211).

3. Present situation regarding food security and future trends

On 21 January 2002, it was established the European Food Safety, which defines the general principles and requirements of European legislation on food and establishes procedures in the field of food safety. In order to adopt the European strategy in this area, the Romanian Government, by the Government Ordinance 42/2004, establishes Agency Veterinary and Food Safety (AVSA).

AVSA strategy, based on the principle that the supervision of animal health and sanitation products of plant and animal origin constitutes a guarantee of safety of the whole food chain, consists of:

- Development of a regulatory proposal provides that the manufacturer is obliged to announce AVSA regarding any food produced through genetic engineering. If the tests are not specific, finds any safety problems or other food-related, it will be sold;
- Organization of rapid alert system (s.r.a.), which sets mandatory measures applicable at the national level on the production and marketing of food and animal feed.

4. Agricultural profile description (size and nature of farming systems to supply seeds, the role of private companies)

In the year 2005, the agriculture contributed with 8.46 percentage points to Romania's GDP (The gross domestic product) and it involved 31.9% from the total labor force. Agricultural area represent about 62% of the total fund, of which more than half (63.9%) is arable land.

Structural changes that have taken place in Romania's agriculture in the last 18 years have led to the passage of private property over 96% of agricultural land and to the formation of small and medium-sized farms.

In the year 2005, according to data from the Statistical Yearbook of Romania, the farms were organized as follows:

- 4 237 889 of individual households with an average area of the farm of 2.1 hectares;
- 1 630 companies / agricultural associations, agricultural area with an average of 455.3 ha;
- 4 574 commercial companies, with an average agricultural area of 376.2 ha;
- 4 818 units of public administration, with an average agricultural area of 441 hectares;
- 108 cooperative units, with an average area of 30.1 hectares of agricultural;
- 6 883 farms of other, with an average area of 22.4 ha;

Thus, in the year 2005, the total number of farms was 4 256 152, of which 4 121 247 farms (the individual units and legally) used an agricultural area of 13 906 701.3 ha, returning an average of 3.4 ha/farm which used agricultural land.

Exports made by the agricultural sector in 2005 were the amount of 413 million euros, which represents 1.86% of total exports.

5. Recent trends in the crop production

In the field of plant production, analyzing the structure of the areas cultivated with main crops, shows a high share (over 69%) of cereals, to the detriment of other cultures. In the year 2005, it is also found a slight increase in the share of industrial plant crops, compared with the year 2000 (14.4% vs. 12.8%).

TABLE 1
Cultivated area, by main crops (thousand hectares)

	2000	2001	2002	2003	2004	2005
Cereals for grains	5 655.2	6 294.9	6 038.1	5 541.8	6 265.4	5 865.7
Dried pulses	41.3	35.6	45.3	46.8	38.6	44.2
Potatoes	282.7	276.7	283.2	282.0	265.7	284.9
Fibre crops	0.9	0.9	1.4	1.6	1.5	2.3
Oilseed crops	1 067.4	938.6	1 076.4	1 377.1	1 197.5	1 205.5
Medicinal and aromatic plants	4.3	10.0	10.6	12.2	9.1	4.6
Vegetables	281.9	269.9	282.0	286.9	308.2	266.7
Green fodder	992.7	937.9	1 105.7	1 182.5	558.4	820.4

Source: Romanian Statistical Yearbook

Thus, for the period reviewed, it was found an increasing trend regarding the areas under industrial plants, both for the textile and for the oil.

For the same period, 2000 - 2005, the average production was 3 009 kg / ha to wheat, compared with the medium potential of the country 5 500 -7 000 kg / ha, and for the culture of maize, the average yield was 3 791 kg / ha, compared with a potential of 8 000 kg / ha of maize grain.

Natural conditions are still the dominant factor which determines the level of these productions. These limits of production can be overcome only through the application of modern technologies, including agricultural irrigation in the plain areas.

THE STATE OF DIVERSITY



Romania's territory consists of three types of relief, present in a relatively equal proportion - plain, hills and mountains, with a high level of pedo-climatic and geographical diversity, found in 52 eco-regions. These include various types of aquatic and terrestrial ecosystems, characteristics to Black Sea seaside, steppe, forest-steppe, hills, mountains, lakes, rivers and river meadow, wet areas, meadow, marsh and rock areas and the Danube Delta. Romania has an unique natural heritage, represented by the Carpathian Mountains (65% of the cross - the Carpathian region) and by one of the most important humid areas on the European continent, the Danube Delta, the second largest in Europe. It is worth noted that approximately 300 000 hectares of virgin forests are located in Romania. In the Carpathian Mountains and the Danube Delta, there are given a number of endemic species, including the species and interest.

In the last 16 years, the natural landscape and Romania have been affected due to socio-political restructuring and development of new fields. Sustained economic growth recorded, over the past seven years, threatens to overexploitation of natural resources. In these circumstances, many species of plants and animals are in danger, the landscape changes as an important indicator of environmental damage. Radical changes that have occurred in the agricultural sector (such as how to practice agriculture – where it moved from a small number of large commercial farms to millions of households, family size small), abandonment of farming activities on land or return to the big one type of traditional agriculture have influenced many of the environmental aspects of agricultural land in Romania.

Today agricultural lands cover about 62% of the total surface of the country, while 39% are arable lands, and about 20% pastures and hay fields. Forests were reduced to about 28% of the total surface of the country.

Abandonment of agricultural land and unsuitable farming practices (stumble burning, ploughing against the slope) due to lack of knowledge or limited financial resources negatively influenced the countryside biodiversity and stimulate the soil erosion. The decrease of animal livestock lead to abandon of traditional grassland therefore degradation of pasture land but, on the other hand, the change of farming pattern due to excessive fragmentation of land had a major impact on preservation of traditional rural landscapes and rich bio-diversity.

1.1 The state of diversity and relative importance of all major crops for food security

During the last 10 years, both the natural conditions and the rural landscape were affected by the evolution of economic activities, the radical farm restructuring process, abandonment of land etc.

The total area of agricultural land in Romania was of 14 741.2 thou. hectares in 2005, representing 61.8% of the total land. The distribution of agricultural areas by use, between 1996-2005 is presented in Annex 1.

Vegetable production includes mostly cereals (69% of the arable area). The areas cultivated with technical plants (rape, flax, hemp etc.), and fodder plants, medicinal and aromatic herbs, are mostly limited because of the difficulties in mechanization posed by these crops. The status of the main crops and evolution of average production by ha over the analyzed period is presented in Annexes 2 and 3.

The average cereal production is not stable from one year to another, as it depends on the climate conditions, and it is relatively low against its potential. The average productions for most cultivated cereals during 2000-2005 were: wheat 2 508 kg/ha, representing 40% of the potential, maize 3 150 kg/ha, representing 39.4% of the potential.

The areas cultivated with vegetables covered more than 260 thou. ha every year during 1996 -2005. Although there is an upward trend (with a maximum of 308 thou. ha in 2004), this production is affected by climate conditions.

Total vegetable production also increased, reaching a maximum of 4 773 thou. tons in 2004 (2005 was a slightly worse year, with only 3 624 thou. tones). Thus, the vegetable production per capita in 2004 reached 220.3 kg (in 2005 it reached 167.6 kg), on a regular increase from 2000, when it reached 112.7 kg/capita.

As far as vineyards are concerned, the areas cultivated with noble grape vines during 1998 - 2005, decreased by 16%. The productivity level of the noble vines is of only 30 hl wine/hectar, a major gap from the average EU, which is of 50 hl wine/hectare. The area cultivated with hybrid vines in individual households also dropped by 20% over the same period.

Also, some of the plantations are aged and natural disasters over the past years also helped destroying others.

Orchards also decreased in surface area year after year, while production dropped both in quantity and in quality. This came as a result of deforestation, with the implementation of the land law, aging natural disasters and lack of funds to maintain the trees. The orchard and nursery areas dropped by 14% in the period of 1996-2005.

1.2 The state of diversity and relative importance of minor crops and underutilized species for food security and agriculture

In Romania, the state of diversity of minor crops and underutilized species and their potential value for food and agriculture are presented in the Annex 4.

1.3 The state of diversity of wild plants harvested for food production

A total of about 3 700 species of higher plants exists in Romania. Among them, 23 species are monument of nature, 74 species are extinct, 39 species are endangered, 171 are vulnerable, and 1 253 are rare species according to the Red List of Higher Plants of Romania, as established by the Romanian Academy in 1994. There are 57 endemic taxa (species and subspecies) and 171 subendemic taxa (with their territory lying mostly in Romania). A very high percentage of the species of plants (4%) are endemic. Grassland species include 37% of the total species represented, while 74 species of higher plants are extinct.

All the 58 species of indigenous trees and at least 30 species of shrubs have an economical importance, producing wood, resin, fruits, flowers, leaves and bark with medicinal character or representing honey sources. Of the 1 300 species of grassland plants, 175 have nutritional value, 70 species are medicinal and 180 are melliferous (important for honey).

It should be pointed out that we refer only to useful wild plants on the level of species. For further details on the various species see Annex 5.

1.4 The state of diversity of crop varieties

For the purpose of this point, cultivated varieties can broadly be classified into "modern varieties" and "farmers' varieties"

Modern varieties

Modern varieties are the products of plant breeding in the formal system, by professional plant breeders working in Romanian publicly research institutes.

The main fields of agricultural research institutions in Romania are in line with the need of farmers as follows:

- Creating varieties and hybrids to plant species used for human food and animal fodder.
- Develop technologies and technological crop sequences.
- Seed production.
- Scientific and technological services (fungicides testing products and herbicides, seed processing).
- Dissemination of scientific research results into practical agricultural producers.

During the 48 years of scientific research (1957-2005), 1 436 varieties and hybrids were created, as a result of the breeding work at 6 National Institutes (Agricultural Research and Development Institute Fundulea, National Institute of Research and Development for Potato and Sugar Beet Brasov, Research and Development Institute for Grassland Brasov, Research and Development Institute for Flower and Vegetables of Vidra, Maracineni Fruit Tree Growing Research and Development Institute Arges, and Research and Development Institute for Wine Growing Valea Calugareasca) and at the stations coordinated by them (Chapter 4, Annex 11).

The National authority for registering modern varieties for all agricultural species is The State Institute for Variety Testing and Registration (SIVTR). The main activity of SIVTR is the technical examination of the varieties which apply for the registration in the Register of Varieties published in the Official Catalogue of Varieties and Hybrids Crop Plants in Romania. At present, the testing activity of varieties of agricultural and vegetable species, strawberry and ornamental plants is performed in 25 Testing Centers, situated in the most diversified ecological conditions of the country, and

constituting the SIVTR official network for variety testing.

In the year 2006, there were recorded in the official catalogue 918 modern varieties created by research institutions listed in Annex 12 (Table 2).

TABLE 2

The present situation of the autochthon modern varieties in Romania

Crop category	Number of modern varieties	Crop category	Number of modern varieties
Cereals	165	Oils and textile plants	90
Rots and tubers plants	125	Fodder perennial plants	58
Medicinal and aromatic plants	47	Vegetables	208
Fruit trees and bushes	155	Vine	70
Total autochthonous varieties			918

At present, the fruits germplasm fond gathered in the collections contains biological material from 11 genera and species, 11 shrubs and strawberry, a total of 5 724 genotypes, 5 568 varieties and rootstocks, 156 species and interspecific hybrids. Of these, local varieties and old autochthonous cultivars represent 42.5%, respectively 2 900 genotypes (table 3).

TABLE 3

The fruits germplasm fund from Romanian collections in year 2006

Nr. crt.	Genus/species	Crop name	Total number of genotypes	Species and interspecific hybrids	Cultivars and rootstock	from which autocht.	Research institution
Fruits trees germplasm							
1	<i>Amygdalus</i>	Almond	128	5	123	70	Oradea
2	<i>Armeniaca</i>	Apricot	663	1	662	423	Constanța Băneasa
3	<i>Castanea sativa</i>	Edible Chestnut	42	3	39	34	Tg. Jiu
4	<i>Prunus avium</i>	Sweet cherry	461	3	458	287	Iași Pitești
5	<i>Prunus vulgaris</i>	Sour cherry	160	16	144	144	Iași Pitești
6	<i>Cydonia oblonga</i>	Quince	73	2	71	62	Tg. Jiu
7	<i>Juglans sp.</i>	Walnut	222	8	214	174	Vâlcea
8	<i>Malus domestica</i>	Apple	872	13	859	462	Voinești
9	<i>Persica vulgaris</i>	Peach	1 075	6	1 069	315	Constanța
10	<i>Prunus sp.</i>	Plum	812	32	780	614	Pitești Vâlcea
11	<i>Pyrus domestica</i>	Pear	536	25	511	164	Cluj Pitești
x	Total fruits	x	5 044	114	4 930	2 797	
Small fruits germplasm							
1	<i>Cornus mas</i>	Cornel	29	1	-	30	Pitești
2	<i>Corylus avelana</i>	Hazel nut	47	5	42	3	Vâlcea
3	<i>Hyppophae sp.</i>	Sea buckthorn	11	2	9	6	Pitești
4	<i>Ribes sp.</i>	Black and red currant	195	5	195	12	Pitești
5	<i>Ribes grossularia</i>	Gooseberry	25	1	25	3	Cluj
6	<i>Rosa sp.</i>	Eglantine	5	5	5	5	Pitești
7	<i>Rubus sp.</i>	Blackberry	36	1	5	2	Pitești
8	<i>Rubus idaeus</i>	Raspberry	109	1	109	5	Pitești
9	<i>Sambucus sp.</i>	Common elder	19	1	-	19	Pitești
10	<i>Vaccinum sp.</i>	Blueberry	50	4	50	8	Pitești



Nr. crt.	Genus/species	Crop name	Total number of genotypes	Species and interspecific hybrids	Cultivars and rootstock	from which autocht.	Research institution
11	<i>Lonicera</i> sp.	Lonicera	5	5	5	5	Pitești
	Total	x	531	31	465	98	Pitești
12	<i>Fragaria</i> sp.	Strawberry	149	11	160	5	Pitești
	TOTAL (fruits + small fruits)		5 724	156	5 568	2 900	
	%	x	100	2.1	97.8	42.5	

Low salaries, inadequate research infrastructure for high performance, as well as the opportunities offered by research programs of other countries, led to a gradual increase in the average age of research and development personnel, so that at present the persons older than 45 represent approximately 50% of the total number of researchers.

In the last years, because of lack of financial sources which were allocated to the agricultural research institutions, many breeding programs were stopped and the own germplasm was stoked in uncontrolled conditions, determining the viability deterioration and losses of some valuable genetic pool (flax, hemp, sunflower, sugar beet, oat, rye, medicinal and aromatic plants etc.). Also, a lot of Romanian modern varieties disappeared, being replaced with foreign advanced cultivars.

“Farmers’ varieties”

It is known that in Romania, after 40 years of cooperativized agriculture, agricultural diversity of ecosystems has declined quite drastically as a result of genetic erosion, and only in certain isolated areas, mountainous depressions, local landraces of the main crop plants are maintained. Within the collection expedition, the specialists from the Suceava Genebank have found that traditional agricultural systems based on old local varieties of wheat, corn, beans, potato, faba bean etc. can be found in the area of Bucovina, Maramureș and Apuseni Mountains.

In these geographic zones, there are approximately 250 villages located between 800-1 620 m altitudes; many of these villages are totally isolated, without modern roads of access. Over there, old local populations, many species of plants and fruit trees: *Zea mays*, *Secale cereale*, *Triticum aestivum*, *Hordeum vulgare*, *Phaseolus vulgaris*, *Phaseolus coccineus*, *Pisum sativum*, *Avena sativa*, *Beta vulgaris*, *Solanum tuberosum*, *Vicia faba*, *Papaver somniferum*, *Capsicum annuum*, *Cucurbita pepo*, *Cucumis sativus*, *Lactuca sativa*, *Anethum graveolens*, *Petroselinum hortense*, *Solanum lycopersicon*, *Satureja hortensis*, *Cornus mass*, *Sorbus domestica*, *Coryllus avelana atropurpurea*, *Ribes species*, *Pyrus domestica* etc. still exist.

Today, the threat resulting from the interaction of many factors is progressing at an alarming rate. The most important factors include the replacement of autochthonous landraces by new, genetically uniform cultivars, changes in agriculture and land use, destruction of habitats and ecosystems, and more recently, floods and global climatic change. The speed of genetic erosion occurs at different rates depending on regions and crops.

1.5 The main factors affecting the state of diversity

During the last decades, the natural conditions and the landscape in Romania were influenced by the evolution of economic activities, as well as by the economic growth from the last years, which led to an excessive exploitation of the natural resources. In these conditions, many species of plants and animals are threatened to disappear and the modification of the landscape is the first indicator for environmental deterioration.

Human activities have significantly modified the Romanian landscape. These modifications have reduced the abundance of certain elements of the ecosystem (most notably steppe grasslands) and also added new components. Although Romania is rich in biodiversity (particularly because of the large size and quality of valuable ecosystems) the country has suffered a progressive loss of biodiversity as a result of human activity. In particular, agriculture, industrial development, transportation and the expansion of cities have affected the biological diversity, both generally and locally. Pollution, alteration to river courses and hydro technical works, resource extraction and overexploitation of natural resources have been the main factors involved. It has been estimated, that in the last fifty years, there has been a permanent loss of 250 000 ha of forest and grassland ecosystems and that an additional 280 000 ha have been temporarily or only partially lost. A total of about 400 000 ha of wetland habitat (most of it along the Danube River) have been permanently or partially lost as well.



Air, water and soil pollution have been and continue to be major threats to biodiversity in Romania. Industrial pollution decreased in the first years of the economic transition process due to significant reductions in industrial output. However, it can be expected that, as the Romanian economy begins to grow, industrial pollution of air, water and soil will begin to rise again unless changes are undertaken by instituting new manufacturing processes or by installing pollution control equipment. The loss of groundwater as a result of hydro technical works has, for example, produced the partial or total drying out of about 20 000 ha of forests.

Resource Extraction and Use and Changes in the Land Use Since 1989, given the economic difficulties experienced by many Romanians, the tendency has been to exploit as much as possible the natural resources available in order to generate quick incomes. There has therefore been considerable illegal extraction and gathering of forest resources, including the cutting of small fir trees, medicinal herbs, and others.

1.6 Future needs and priorities

In order to ensure the long-term conservation of the biodiversity, it is necessary to develop and implement a national strategy and ensure coordinated management. The following objectives describe the elements and importance of Romanian biological diversity and propose actions needed to ensure that these natural values are retained for future generations and that they are utilized to ensure sustainable development.

a) Protected of the natural ecosystems

Taking into account the present status of the biological diversity in Romania and the threats that affect it, the following priority activities will be delineated:

- Conservation of Romanian ecosystems and habitats by creating a national system of protected areas networks;
- Threatened endemic, rare wild species and those with a high economic value *in situ* and *ex situ* conserved;
- Establishment of necessary legislative framework and institutional capability for biological diversity conservation;
- Special research and development programs for biological diversity conservation.

b) Preservation and improving the state of the natural resources and habitats

The protection and enhancement of natural resources and habitats is a high priority for Romania, in accordance with the environmental needs of its rural areas, various international obligations and the strategic guidelines established by the European Commission. Farmers and other relevant land managers will therefore be encouraged to introduce or continue the use of agricultural production methods that are both compatible with the protection and improvement of the environment and go beyond the relevant baseline standards.

The main environmental issues that will be targeted under this strategic objective include:

- Conserving areas of High Nature Value (HNV) farmland which are under threat from changing land use, agricultural intensification and/or abandonment. Although the concept of High Nature Value (HNV) agricultural land is not yet fully developed and applied in Romania, it is highly relevant since there are many traditional farming systems and areas of extensively-managed agricultural land that support a high diversity of wildlife species and habitats, and/or the presence of endangered wildlife species of European/global significance;
- Improving soil and water management, including in those areas affected by severe soil erosion and at risk of high nutrient losses;
- Developing organic farming as an environmentally-friendly and profitable method of agricultural production.

This includes Nature 2 000 sites and other national protected areas which are of prime importance for nature protection.

c) Improving the environment and the countryside

The future measures will be focused upon maintaining and enhancing the quality of the rural environment in Romania, by promoting the sustainable management of both agricultural and forestry land. This is in recognition of the need to:

- Encourage a better balance between the economic development of rural areas and the sustainable use of the natural resources upon which present and future economic growth will be built and maintained;
- Financial support for farmers and foresters for providing environmental services;
- Support the conservation and protection of wild flora and fauna, soil and water in accordance with EU environmental objectives relating to agriculture and forestry, including the maintenance of High Nature Value (HNV) farming

systems, management of Natura 2 000 sites, obligations of the Water Framework and Nitrate Directives, and the mitigation of climate change;

- Maintain and enhance the attractiveness of rural areas as the basis of farm diversification and other alternative economic activities, especially regarding tourism and leisure activities.

d) Rescuing of rare plant varieties

This objective could be mentioned that a great number of local varieties resist at an altitude superior to 800 m and these represent important resources in improving quality, disease resistance of varieties for mountain regions and not only there. Some of these varieties can be directly reintroduced to gardening, used in breeding programs or kept *in situ* in order to prevent their loss for the future generations.

Scientists must continue to be able to draw upon this genetic diversity for the next generations. Urgent actions for safety of rare plant varieties in the Carpathian Mountains are necessary:

- Initiating of national programs for conservation and protection of germplasm of obsolete cultivars and landraces;
- Setting off a regional network for monitoring and conservation strategies in rare plant varieties;
- Propagation and return of local varieties to the area of their former dissemination;
- Initiating of the national and regional projects with participation of the local communities;
- Partnership between authorities at international, national, regional and local levels;
- Preparation of the short lists of the obsolete cultivars, local landraces and wild useful plants which are the most endangered and should be primarily conserved;
- Specialists and general population trained and educated in biological diversity conservation principles;
- Involvement of NGOs and local communities in programs for biological diversity conservation.

IN SITU CONSERVATION AND MANAGEMENT OF PLANT GENETIC RESOURCES

2.1 Inventory and study of plant genetic resources: assessing current state and priorities

2.1.1 The legislative framework in Romania for nature conservation

Since 1990, it became obvious the need for concrete legislative and institutional measures in order to ensure an efficient management of the protected areas. That time the Ministry of Water, Forests and Environmental Protection (MAPP) issued the Order no. 7/1990, setting up a number of 13 national parks.

In 1991, the Environmental Ministry was set up, as central authority for organizing the institutional framework, enhancing the work for environmental protection at the national level, having under coordination the County Environmental Protection Agencies, Autonomous Romanian Waters Agency, Romsilva, and Mineral Waters.

Also, in the year 1991, Danube Delta has been approved as Ramsar site and as the site of the World Natural Heritage for 50% of its area, becoming the Biosphere Reservation, and, by GD 248/1994, Danube Delta has been recognized as Biosphere Reservation and by Romania.

Based on the soils and the vegetal cover in Romania 22 eco-regions there have been identified in the year 1994. Next year, in 1995, the Environmental Law no.137 was adopted, which contains provisions relating to nature conservation and protected areas and acknowledges all previously declared protected areas by any law, order, resolution or decision.

With the financial assistance of the World Bank, in 1996, it was designed "National Strategy and Action Plan for Conservation of Biological Diversity and Sustainable Use of its Components in Romania".

Within the Ministry of Water, Forests and Environmental Protection is acting, since 1997 a Directorate for Biodiversity Conservation that has the responsibility to plan and coordinate all activities relating to nature conservation in protected areas.

2.1.2 The protected areas system in Romania

Although in the past 15 years the percentage of national protected area has increased 14 times, respectively from 0.37% in the year 1989, to 5.19% in 2003, it represents only half of the European average of the value (10.19% in 27 June 1994 according to IUCN - the International Union for Conservation of Nature).

A large proportion of these protected areas are included in national parks, natural parks and biosphere reserves. At the end of 2004, they covered the total area of 1 702 112 hectares, representing 7.14% of the country's surface (23 839 100 hectares) (Annex 6).

In accordance with the law 5/2000, Romania has 941 protected areas, divided into 5 of the 6 IUCN categories (table 4).

TABLE 4

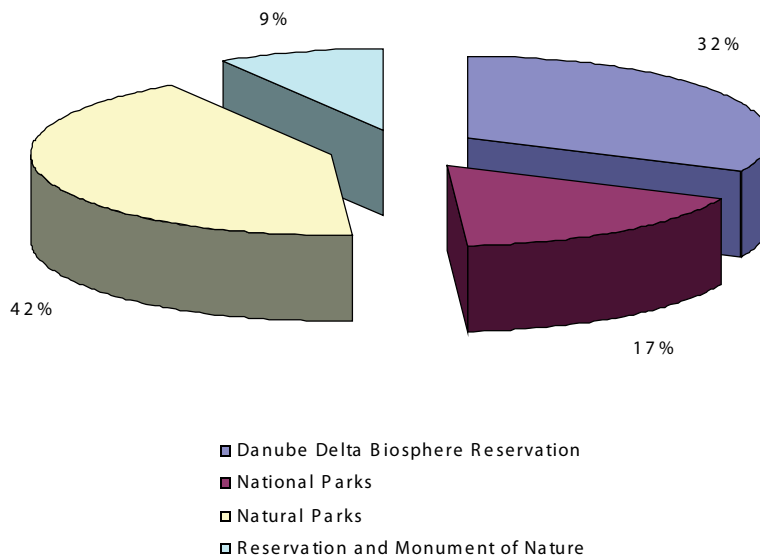
Protected areas in Romania, according to the IUCN categories

Type of protected area	IUCN categories	No. of protected areas	Total area
Scientific Reserve	I a	55	111 277 ha
National Park	II	13	315 857 ha
Monument of Nature	III	234	7 705 ha
Natural Reserve	IV	617	204 355 ha
Natural Park	V	13	728 272 ha



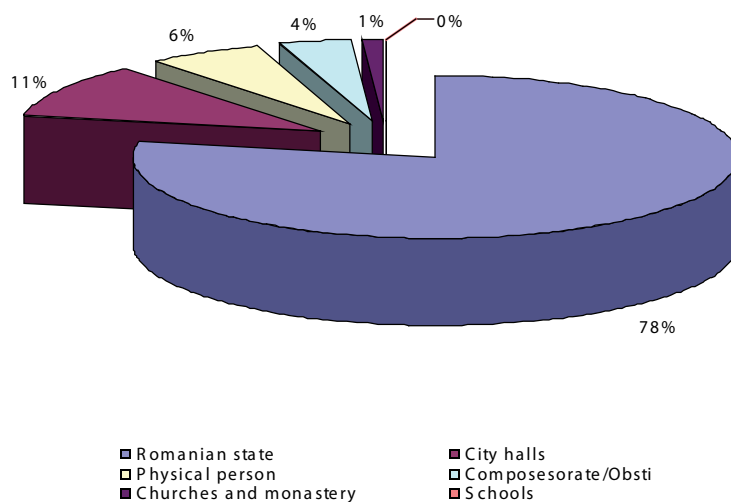
The functional structure of the protected areas in Romania shows that the largest surface belongs to the natural parks with a percentage of 42%, followed by the Biosphere Reserve of Danube Delta with 32% (figure 1).

FIGURE 1
The functional structure of protected natural areas in Romania



Regarding the ownership structure of national and natural parks, Romanian state owns 78%, followed by town halls with a rate of 11% and 11% of the difference is held by individuals, schools, religious institutions (figure 2).

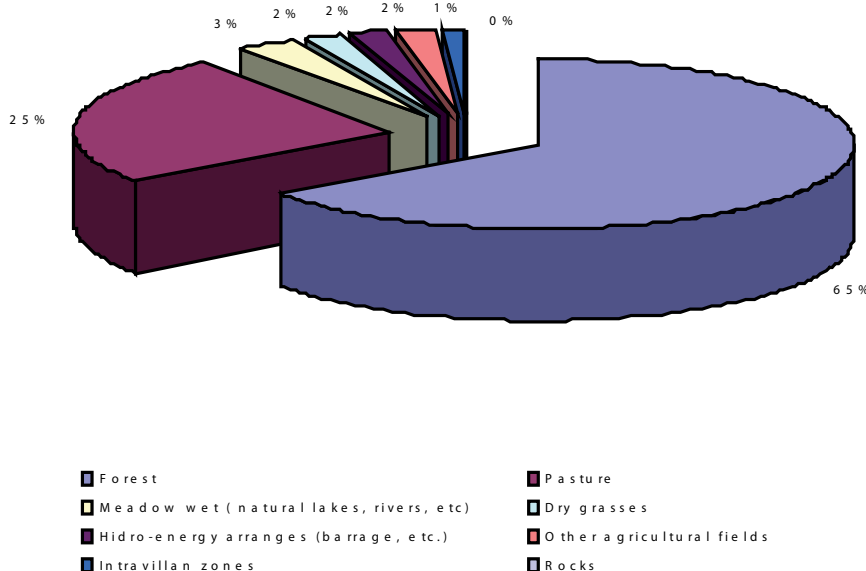
FIGURE 2
The structure of ownership – National and Natural Parks in Romania



The Danube Delta Biosphere Reserve is in major owned by the state (89%) and only 11% of the area is in hands of private individuals.

Over half of the national parks area is forest, with a rate of 65%, followed by pasture with 25% (figure 3).

FIGURE 3
Use land categories in National and Natural Parks of Romania



Natural areas in Romania have a great economic importance, through their multiple uses in forestry, tourism, hunting, fish etc.

With the exception of large areas of agricultural and terrestrial ecosystems under the negative impact of the pollution sources, the rest of the natural environment retains quality parameters, providing the necessary conditions for the conservation of biological diversity.

2.2 *In situ* conservation of wild crop relatives within protected areas

With the remark that in Romania there is not a national inventory on crop wild relatives growing within protected areas, we present some general information on wild species that are under protection law.

Romania entered in the first 6 European countries regarding the number of species of plants and animals. Plant species are estimated at nearly 20 000 species of which 3 630 are spontaneous cormophyte (40% of European cormoflora), i.e. higher plants (ferns and plants with flowers). In addition, in Romania 800 hybrid species are to be found. Out of the 3 630 species, almost a third do not grow in Western Europe and approximately 500 plant species are protected by law because of their rarity or therapeutic interest.

Endemic species (with a number of 57 taxons and 171 subtaxons – Annex 7 and Annex 8) are 4% of the total protected species, and 75% of them have been identified in the Carpathian Mountains region. *Andryala levitomentosa* grows only in Bistriței Mountains, *Dianthus callizonus* is found only in Piatra Craiului Mountains, *Astragalus peterfii* has been reported only in the Cluj county, *Draba dorneri* in Retezat Mountains, while *Diantus spiculifolius*, and *Helictotrichon decorum* can be found in the whole Carpathian chain. Of the total species endemic in Romania, 37% are characteristic to pasture.

Researches in phyto-geographic flora have shown the presence of numerous tertiary and glacial relicts, which are scientifically and aesthetically important, now being considered natural monuments, and protected by law (Annex 9).

It was noted the existence of 109 dioic taxons of traheofite, spontaneous or sub- spontaneous, representing 2.78% of Romanian Flora. The main centres of endemic species are Rodna Mountains, Bistrita-Ceahlau, Bucegi-Piatra Craiului, Retezat-Godeanu, parts of these massive mountains were declared national parks, together with other areas of interest for the preservation of biodiversity (table 5).

Besides *Campanula romanica* and *Aquilegia nigricans* other 6 of endemic species have been declared vulnerable; in danger of extinction are *Centaurea pontica*, *Minuartia cataractarum* together with other 5 species, while 25 are rare, including *Cephalaria radiata*, *Galium bailloni* and *Andryala levitomentosa*, *Fumaria jankae* are very rare.



These endemic species have an economic value: 26 species are melliferous (of which: *Anthemis carpathian* ssp. *pyrethriiformis*, *Dianthus callizonus*), 9 species are medicinal (of which: *Primula auricula* ssp. *seratifolia*, *Viola jooi* etc.), and *Thymus bihoriensis*, and *Salvia transsilvanica* can be included in both categories.

TABLE 5
Taxons inventoring in major protected areas

Parks name	No. of species	Endemic taxons				Monuments of nature	Relicts		Forage plants	Medicinal plants	Melliferous plants
		Carpathian	Balcanic	Pontici	Rare species		glacial	Tertiary			
National Parks											
Piatra Craiului	1 170	55			109	5					
Munții Rodnei	1 123	13			12	15	7				
Retezat	1 200	24			42						
Domogled – Valea Cernei	1 110		110		66						
Ceahlău	1 100	62					3				
Călimani	774	33	3		33	2		17	10		
Cozia	932	15	5		13	5					
Semenic - Cheile Carașului	1 086	5	11	6							
Cheile Bicazului – Hășmaș	1 050	15	45		90	5	9	4			
Cheile Nerei – Beușnița	1 086				7						
Munții Măcinului	562	27	6		72						
Defileul Jiului		3									
Natural Parks											
Apuseni	1 000	25			30	8		59	131		
Porțile de Fier	1 700	7			20						
Balta Mică a Brăilei	221										
Grădiștea Muncelului – Cioclovina		4			8						
Bucegi	1 183	74			10						
Vânători – Neamț	1 047	10			50			16	15		
Munții Maramureșului	682	26						46	50	38	
Putna – Vrancea								111	183	267	
Comana	1 250					70					

2.2.1 Plant genetic resources for food and agriculture preserved in protected areas of Romania

To avoid the overexploitation of these resources, since 1997, progress has been done through regulating the activities connected to harvesting and purchasing of plants from wild flora and other assets of natural heritage, in the scope of marketing. A wide variety of species of flora in Romania presents an economic and social importance, having multiple uses in various sectors. Utilisation has no future if resources are not sustainably preserved, and conservation remains an end in itself, if resources are not properly evaluated and used.

It is known that the effectiveness of medicinal plants decreases, most often from the Equator to the Poles and, their toxicity as well. Romania being located on the parallel 45° (degrees), the active principles of plants (both those helpful and harmful to the body) are, in general, in medium levels of concentrations. Further, the species included in the Romanian Pharmacopoeia that are recognized for their qualities, are less affected by pollution, particularly the chemical one.

Of the total spontaneous plants in Romania, medicinal plants represent 92.9% and 21.62% of them (about 800 species) have therapeutic effects, and 10% (about 370 species) are active in terms of pharmaceutical effects. Of the total medicinal species within the country 55 species are cultivated.

The most important botanical families including medicinal species are: *Asteraceae*, *Lamiaceae*, *Fabaceae*, *Umbelliferae*.

Romania is recognized in Europe as a country with tradition in beekeeping. Beneficial effects are related to ensuring the pollination of entomophilous spontaneous or cultivated plants and the utilisation of the apiculture products (honey, wax, pollen, bee glues, venom etc.).

Wild fodder species provide on average, over 50% of the needs of fodder equivalent green mass, for sheep and cattle, while in mountain areas the value exceeds 60% of the consumption. Meadows vegetation is a great genetic source for forages breeding programmes.

2.2.2 The objectives, priorities and strategy for the conservation of biological diversity

Considering the current state of biodiversity in Romania and the dangers that face there were established the following priority objectives:

- developing the legislative framework and institutional capacity building for a sustainable use of resources;
- improving the organization and functioning natural reserve to ensure the conservation of nature, at its importance;
- conservation of natural habitats and species of wild fauna and flora;
- harmonization of strategies of economic sectors with the national strategy to protect the environment;
- conservation and increase biological diversity by reducing the negative impacts of different types of pollution and ecological reconstruction of damaged ecosystems and habitats;
- protection, conservation and restoration of biological diversity by applying specific agro ecosystems technologies conducive to a sustainable agriculture;
- organization of the National Network of Protected Areas Management and providing necessary protection of natural habitats and conservation of biological diversity;
- *in situ* and *ex situ* conservation of endangered species, endemic and/or rare, and those with high economic value;
- integration of environmental protection programs in the National Development Strategy and integration in political programs from local and sectoral communities;
- protection, conservation and restoration of biological terrestrial and aquatic diversity, existing outside of protected areas:
 - reducing and eliminating the negative effects caused by pollution of living environments, overexploitation of natural resources and the misuse of the territory;
 - the reconstruction of degraded ecosystems and habitats;
 - demarcate inside national parks in terms of the need for conservation of biodiversity;
 - the development of standards development of forests, hunting fund, in accordance with the objectives of conservation of biodiversity;
 - the development of rules for management of meadows, in view of their outstanding scientific and economic value;
 - the establishment of precise rules for the conduct of ecotourism, to secure a sustainable development of such activities;
- training of specialists and educate the public understanding of the need for conserving biological diversity and sustainable use of its components;
- the involvement of NGOs and local communities in programs and actions of protection, monitoring, conservation and restoration of biological diversity;
- development of research programs and monitoring of biological diversity with a view to developing measures for intervention in protected areas;
- promotion Law arrangement territory, including in Section III of Chapter Protected Areas;
- editing of informative materials for the conservation of biodiversity;
- development of economic instruments through which local communities to be involved in the conservation of biological diversity.



2.3 Management and improvement of traditional varieties and local landraces on-farm conservation for food and agriculture

Romania is one of few European countries where traditional agro-ecosystems represent significant reservoirs for *in situ* conservation of crops genetic diversity. Maintaining this diversity in farmer's households is the key for obtaining stable productions, especially for those with limited resources, who practice a less intensive agriculture and live in remote areas, isolated, in mountain depressions. Further, the existence of the valuable germplasm is a guarantee and a genetic resource for the creation of modern varieties with higher productivity.

It is known that in Romania, after 40 years of cooperativised agriculture, the diversity of agro ecosystems dropped quite drastically, as a result of genetic erosion, and only in certain isolated rural communities, in mountain depressions, local landraces and traditional varieties of the main crops are still maintained.

Because of major changes that affect all life sectors in Romania, genetic erosion is more accelerated in these areas, and preservation of traditional varieties, less productive, but holders of some valuable characteristics, should be supported and promoted both in terms of financial and legislative, through achievement of the following actions:

- Locating, inventory and assessment of genetic diversity of traditional varieties of some important plant species in terms of socio-economic from mountain depressions, with a high degree of isolation;
- Conservation and sustainable utilization of existing biodiversity, both at the farmer's households, from mountain and sub-mountain areas of Romania and even in Suceava Genebank;
- Improving the quality of life and ensuring food security of rural communities in Romania;
- Promoting the culinary qualities of the local varieties in agro-tourism, in full development, on the principle of conservation through utilization for development.

Within collecting expeditions, specialists from Suceava Genebank have found that traditional agricultural systems based on old local varieties of wheat, corn, beans, potato, bean, still can be found in the following areas:

- **Bucovina:**
 - *Zea mays* – maize
 - *Phaseolus coccineus* - bean
 - *Solanum tuberosum* - potato
 - *Vicia faba* - faba bean
- **Maramureş:**
 - *Zea mays* – maize
 - *Phaseolus coccineus* - bean
 - *Phaseolus vulgaris* - bean
- **Apuseni Mountains:**
 - *Triticum monococcum* - small spelt
 - *Zea mays* – maize
 - *Phaseolus coccineus* - bean
 - *Solanum tuberosum* – potato

The agricultural potential of Romania results from the ways of using the land relief. Depending on the qualities and geographical position of agricultural lands, various sectors of agriculture were structured and developed. A branch with the old traditions of Romanian agriculture is the culture of cereals: wheat, maize, barley and less sorghum, rice and oat. The main cereal regions are: Romania Plain, Western Plain, Moldova Plateau, Dobrogea Plateau, Transylvania Depression and Getic Plateau.

The main technical plants cultivated in Romania are: sunflower (mostly in south-eastern country), soybean, beet, flax and hemp. In cold areas (Suceava Plateau, depressions from the Eastern Carpathians, northwest of Transylvania Depression) and in the plain areas around the urban throng of people, potato is sowed. Legumes and vegetables for beans are cultivated mostly in the surrounding of towns and in the meadows of the rivers. Wines crop has old traditions in Romania. The main wine-growing areas are: vineyard Cotnari - Iaşi-Huşi, vineyard Nicoreşti Iveşti, Călugăreasca Valley, Panciu, Odobeşti, vineyards from Getic Plateau (Stefăneşti, Drăgăşani, Strehai), vineyards from Dobrogea Plateau (Murfatlar, Niculiţel), vineyards located on Mureş and Târnava etc.



Fruit trees cover, also, large areas in Getic Sub-Carpathians, Curvature Sub-Carpathians, southern part of Banat), Suceava Plateau, Hațeg Plateau.

Old landraces of fruit trees from Carpathian Mountains were submitted to natural selection by unfavorable environmental conditions and they have been adapted to the specific climate of the mountain zone. Good taste and resistances to diseases and pests constitute important characteristics of this genetic fond. The rural inhabitants are using now local varieties belonging to about 20 species of fruit trees. In the Western Carpathians, over 200 local landraces with a high productivity were identified, very well resistant to storage conditions and diseases.

Also, there have been inventoried 85 local landraces of pear tree with different characteristics concerning the structure of kernel, the flowering date, tolerance to diseases, pests and vigour trees.

In mountain and sub-mountain areas, local populations of *Cornus mass*, *Sorbus domestica* and *Coryllus avelana atropurpurea* can be found. Some local varieties of *Cornus mass* and *Sorbus domestica* are now kept only in private farms. *Coryllus avelana atropurpurea* is found especially in the northern part of the country, traditional varieties that belong to this species being threatened with extinction.

Small colonies of *Ribes* species develop sometimes spontaneously other forms of vegetation. Some local populations of gooseberry can be found only in Maramures, and the black varieties of gooseberry grow only in Apuseni Mountains.

In the Carpathian Mountains there are over 100 species and 75 intraspecific hybrids of bramble, that's why this area can be considered the centre of genetic diversity for *Rubus* genus.

Other species that are only in very small populations: *Fragaria moschata*, *Vaccinium myrtillus* var. *leucocarpus*, *Vaccinium oxycocum* var. *microcarpus* and some local varieties of *Vaccinium vitis-idea*, *Rosa damascena* and *Rosa pendulina* are threatened with extinction.

In the last 50 years, biodiversity has dropped a lot. Many of valuable genotypes of fruit trees were lost because of agriculture collectivization, development livestock farming and introduction of modern technologies.

Keeping in dynamic manner (*in situ*) through cultivation year by year of local populations aims not only the genetic diversity conservation, but also the health of ecosystems, of the environment and improving quality of life for marginal rural communities.

2.3.1 Strategies and priorities

Improving the quality of life and ensuring food security of rural communities from isolated mountain and sub-mountain areas constitute a worldwide concern, but the manner of approaching and solving the problem depends in a large measure on the financial possibilities, the technical level and not at last, on a rational policy directed to save, preserve and sustainable use what the nature and people have created along time.

The priorities are established behind a review of current local situation, concerning both weak and hard points, and the opportunities of local rural economy.

In Romania, in case of large lands from depression areas, old traditional cultivars and local landraces have been replaced by new ones, by modern varieties. Although genetic erosion is quickly amplified, 10% of the agricultural area is still represented by areas with traditional agriculture, where local populations and local varieties are valued in many families for their qualities and special uses as part of traditional life.

Sustainable use and conservation of local germplasm, in those three above referred regions, constitute a scientific and practical strategic priority for the coming years. Also, actions related to *in situ* - on-farm conservation of agricultural biodiversity are necessary, including the location and setting the frequency of these old cultivars, through:

- Inventory-based on survey of local populations, authentic in isolated regions from mountain areas;
- Identifying localities and farm families who are growing old local populations;
- Establishing contracts on a voluntary basis on a certain period of time with farmers who have grown landraces of the main crops. Farmers engaged in this voluntary commitment it is supposed to:
 - cultivate only traditional varieties (landraces), using traditional seeds, or provided by Suceava Gene bank's collections;
 - provide biological material for *ex situ* conservation;
 - use traditional agriculture technologies, through:
 - a. use of organic fertilizers;
 - b. production of own seed and planting material respecting isolation spaces characteristic for cross-pollination species;
 - c. adoption of management practices favourable for environment (elimination of chemical treatments with negative effects on it);

- d. the provision of financial support for farm families who grow local populations of plants for the production deficit due to the use of local germplasm;
- e. registration in "The official catalogue of crop varieties in Romania" of authentic local landraces, which are threatened with extinction.

There have been several attempts from some research institutions, agricultural universities and especially Suceava Genebank to slow on-farm genetic erosion process by convincing farmers to maintain their old traditional cultivars, local landraces, which grow under the influence of natural selection, as well as the artificial selection, resulting in this way new ecotypes with higher adaptability qualities.

However, economic situation from the last period encourages farmers to purchase seeds belonging to modern varieties, so it is not limited access to new germplasm sources. Now, only in isolated mountain areas without roads of access and with a specific pedoclimatic, there is limited use of modern varieties, farmers preferring to manage their farms in agreement with ecological guide in agriculture, through preservation and cultivation of old local populations better adapted to local conditions, thus continuing a permanent policy for re-use of these seeds from own harvest.

In Romania, there are no specific programs of cooperation between formal and informal sectors, to encourage farmers to identify crops, selection, improvement and maintenance of seeds. However, there are regional centers for agricultural consulting, at the county level, as a linkage between staff from agricultural research and farmers. In these centers, on-farm conservation courses were not organized, only some informative activities developed in agreement with environmental conditions and the particular needs of farmers, most of them regarding agricultural techniques, plant diseases and extermination of pests. Knowledge accumulation by farmers regarding selection, improvement, management, use and processing of crops is necessary to improve the on-farm activities, and was monitored to a certain extent only by staff of Suceava Genebank. Now, it is the only research institution that has been and it is involved in improving on-farm programs, research projects and to promote on-farm management.

THE STATE OF *EX SITU* MANAGEMENT



3.1 The state and types of collections (major and minor crops)

Two ministries and Romanian Academy of Sciences are involved in coordination of PGR *ex situ* management, through different stakeholders' activities:

- Genebank of Suceava;
- 6 agricultural research institutes;
- 6 agricultural and biological universities;
- 9 botanical gardens.

Except in the case of **Suceava Genebank**, all collections are maintained as working collections (at room temperature) and are used for breeding, research or teaching purposes.

Genebank of Suceava was established as autonomous institution in 1990, it is coordinated by The Ministry of Agriculture and Rural Development and entirely financed by the budget.

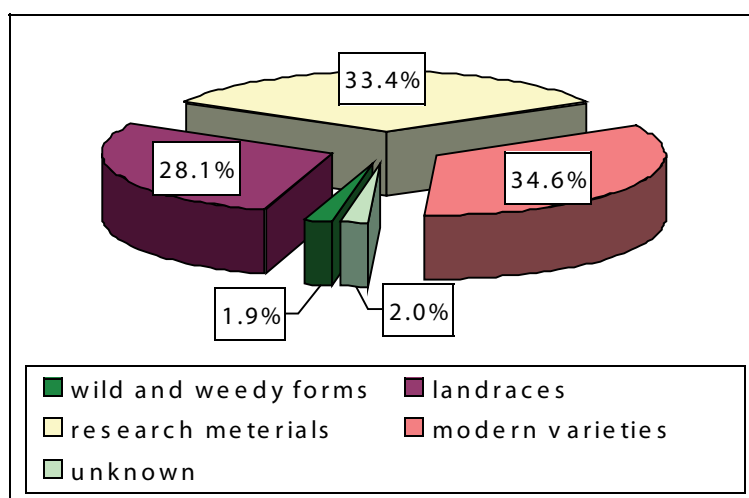
Over 40 000 accessions are stored at the breeding centers in Romania. A small part of working collections, kept by the institutes responsible for these crop plants, were included in the National Collection held at the Suceava Genebank, in the past 10 years. The National Catalogue of Plant Genetic Resources, reflecting the status of representative *ex situ* collections, edited by Suceava Genebank in 2000, with the support of International Plant Genetic Resources Institute, consists of seven fascicles:

1. Cereals;
2. Grain Legumes and Vegetables;
3. Forage, Tuber and Root Plants;
4. Industrial Plants;
5. Medicinal, aromatic and Other Plants;
6. Fruit Trees;
7. Vine Grape.

The aim of this centralized Catalogue is to make the Plant Genetic Resources material available to breeders and researchers.

Suceava Genebank is, also, the host and manages the National Plant Genetic Resources Database, consisting of passport data, sent by 37 stakeholders, for about 43 000 accessions and 747 species. The 14 types of samples biologic status could be distributed in five main groups, presented in the figure nr 4.

FIGURE 3
The percentage of samples biologic status from Romanian PGR Inventory



The biggest parts of National PGR Inventory belong to the modern varieties and research material, having almost similar proportions (34.6%, respectively 33.4%). On the third place could be found local landraces representing 28.1%, of the total accessions. Other data in relation with these five biological types are registered in the table 6.

TABLE 6
Some passport descriptors included in the Romanian PGR Inventory

Specifications	Wild forms	Landraces	Research material	Modern varieties	Unspecified
Total acc. number	800	12 074	14 334	14 854	846
Acc. in Suceava Genebank	378?	8 213	3 790	1 665	284
Acc. originated in Romania	339	10 807	7 620	2 411	176
Total species number	325	419	228	245	117
Total genera number	100	218	81	97	66
Main genera	<i>Amaranthus</i> <i>Cannabis</i> <i>Linum</i>	<i>Phaseolus</i> <i>Vicia</i> <i>Zea</i>	<i>Hordeum</i> <i>Linum</i>	<i>Hordeum</i> <i>Linum</i> <i>Triticum</i> <i>Vitis</i>	<i>Hordeum</i> <i>Lolium</i> <i>Triticum</i>
Kipping institutes number	20	25	30	32	19

The data cover a wide range of biodiversity and were standardized to get a relevant passport descriptor list, according to those recommended by IPGRI. Every year, the National Inventory database is updated and all information are included in European Plant Genetic Resources Search Catalogue (EURISCO), too.

The development and publication of this National Inventory would not be possible without collaboration of all collection curators, the efforts of many persons within and outside the Suceava Genebank and the technical and financial support of International Plant Genetic Resources Institute.

Improving collecting activities, *ex situ* conservation techniques and facilities, characterization, evaluation and the germplasm documentation, are, also, part of the national Romanian Genebank program.

3.2 Collecting

In the genebank collections, out of 13 555 samples belonging to over 350 plant species, about 8 100 accessions (57% from the seed collection) are represented by local landraces, which are subject to genetic erosion and extinction. Many of these varieties were collected prior to disappearance, and now are conserved *ex situ*, only at Suceava Genebank.

Collection was focused on getting as much as possible intra and interspecific biodiversity for the enrichment and diversification of seed accessions. The completion and systematization of herbarium is the second goal of this activity.

These collecting missions are, usually, performed in the isolated mountainous villages with small fields, where old local landraces as well as traditional agricultural practices are still used. The local varieties have a complex pattern of diversity that continues to disappear because of some social problems, such as decreasing and ageing of rural population, lack of support and interest of young people. It is important to encourage and develop this on-farm conservation, and we have to observe that the communities in these isolated areas are poor and they need long-term help.

Erosion includes not only loss of species, but also of knowledge related to those resources. Bucovina, Maramures and Apuseni Mountains are considered the last refuges of the Romanian traditional agriculture. The majority of rural people especially that from marginal areas, depends on the food they produce themselves, without high-energy costs, like use of fertiliser and irrigation.

Genebank organize 2–3 collecting expeditions every year, and around 36 missions were done in 15 years of activity; 40 counties and 1 146 localities were explored. The main goals of collections were landraces and material under cultivation, in the second line being wild species.

In the last 10 years, international collecting missions were undertaken in Apuseni Mountains and Maramures area, with the participation of scientists from Hungary, Syria, Russia, Poland and Germany. Valuable samples of maize, beans and cereals, including *Triticum monococcum*, which is a very rare and threatened species, have been collected.

Besides seed samples and vegetative propagation materials in the collecting missions, some information are gathered through a questionnaire developed by Genebank specialists on the basis of relevant information from IPGRI Training Guide for *in situ* Conservation on-farm. Data collected during the missions are introduced in the Genebank database named "Biogen"

3.3 Storage facilities

The collection maintained at the Genebank represents a specific part of the known national genetic diversity for cereals, industrial crops, legumes, medicinal and aromatic plants, fodder crops and wild relative species. Conservation represents one of the principal activities of the genebank, in order to keep the viability and genetic stability of the stored material, as long as possible.

Collections security during processing phases and storage, monitoring the physical parameters in the conservation chambers as well by, carried out by using a computer assisted program, constitutes a permanent objective in the samples preservation. The sequence of the main operations from the entering of the seed accessions into the bank includes: cleaning, health control, seed moisture content assessment, material drying, and packing.

At present the Suceava Genebank detains two types of seed collections:

1. **base collection** is hosted in two cells at –200C. Its establishment has been started in the year 2001, by duplicating freshly regenerated material from the active collection, as well as from original samples brought from collecting trips. The collection consists of 3 272 accessions, belonging to 29 plant species; the best represented being *Triticum aestivum*, *Zea mays*, *Phaseolus vulgaris*, *Vicia faba*, *Hordeum vulgare*, and *Linum usitatissimum*. The genotypes are packed in aluminium foil bags.
2. **active collection** is kept in four chambers, at +40C. This type of storage covers the genetic diversity of all relevant crops for Romanian agriculture, including their wild relatives, being destined to direct or indirect utilization. Now, the active collection is comprised of 350 species with 13 555 entries. The samples are encased in glass jars, hermetically closed.

Numerical codes are used to locate an entry within the cold store. The location, date of storage, date of multiplication, number of regeneration cycles, seed moisture content, and germination capacity of each accession and container are introduced into genebank database files, and in hard copies, too. The database includes information on all accessions entered in the collections or distributed to different users.



***In vitro* conservation**

Potato is one of the vegetative propagated crops for which the use of tissue cultures as a rapid micropropagation and conservation procedures were established. The *in vitro* collection contains 90 old local potato varieties, on slow growth medium cultures, associated with temperature reduction (6 – 120C).

Field collection

Another way for conservation of vegetatively propagated species, used by Suceava Genebank to preserve 160 old potato varieties, is their cultivation, year by year, in the experimental field. There are, also, small collections of onion and garlic landraces.

The rising of security of conserved genotypes is the main objective of the genebank, related to improvement of facilities, methodologies and research on plant and seed physiology. All the actions promoted by Suceava Genebank are focused on a better protection of national agrobiodiversity.

3.4 Security of stored material

There is not a duplicate collection for the Romanian germplasm detained in the Suceava Genebank, but in the future it will be a need to take up the discussion on safety base collection, which will have to be assured in another place. The most appropriate samples, very well documented, included for molecular analyses, should be selected to achieve a rationalized core collection management.

The principal obstacle in the establishment of this new base collection is not technical, but rather a problem related to the lack of financial support.

3.5 Documentation and characterisation

Documentation is based on Visual Fox Pro software, keeping the evidence of the passport information, samples conservation, morpho-physiological assessments, biochemical results, and herbarium data. Researchers and other users need data about traits of particular materials and genebank scientists routinely characterize and evaluate germplasm. Internal users can obtain statistical information for all records from "Biogen" database.

Some other cross-references are accessible on Internet at the bank site: <http://www.svgenebank.ro>

To prevent the loss of viability, **regeneration** is required when the germination capacity falls below 85% and **multiplication** is done when the number of the seed samples can not assure a normal utilization of the material. These activities are undertaken, year by year, in the experimental field of genebank. Lack of funding and insufficient equipment, the need for isolation of cross-pollinated plants, can be considered as main constrains and the causes for an accumulation of regeneration backlog.

Morpho-physiological descriptors are based on IPGRI descriptors list, associated with some other characteristics important for breeders, especially those regarding the resistance to biotic and abiotic stress. From 13 555 accessions, hosted by Suceava Genebank's storage, about 2 407 accessions (17.5%) were characterized in the experimental field.

Biochemical evaluation is based, also, on IPGRI descriptors lists, and 2 893, representing 21% of the amount, have already been characterized by classical methods, such as the Kjeldahl, Ewers-Grossfeld and Soxhlet. The necessity of molecular analyses should be underlined, to provide valuable information on genebank collections, to get a duplicate screening and a future rationalization of samples conservation.

3.6 Germplasm movement

Exchange of germplasm at national and international level it is not intensive. The main part of samples distributed by the genebank is for theoretical research purposes. The cooperation can promote utilization of Genebank's collection by exchanging with other similar institutions, breeding or research centres.

The samples are free of charge and the collections have to be better known. Publishing a catalogue containing traditional varieties and landraces, that has been lost in the original areas, but is still maintained in the genebank, can raise the germplasm restoration and utilisation. Romanian Genebank continually seeks to improve the efficiency of germplasm conservation and valorisation.



3.7 Roles of botanical gardens

The Association of Botanical Gardens of Romania is a NGO that includes 10 botanic gardens (nine from Romania and one from Republic of Moldova).

- Botanical Garden “Dimitrie Brandza” of the University of Bucharest
- Botanical Garden “Alexandru Borza” of the University “Babes-Bolyai” Cluj-Napoca,
- Botanical Garden of the University of Craiova,
- Botanical Garden of Complex Museum of Natural Science, Galati
- Botanical Garden “Anastasiu Fatu” of the University “Al. I. Cuza”, Iasi.
- Botanical Garden of the Biological Research Institute, Jibou.
- Botanical Garden Macea of the University Vest “Vasile Goldis”, Arad.
- Botanical Garden of the University of Medicine and Pharmacy, Targu-Mures.
- Botanical Garden of Children Palace, Tulcea.
- and the Kisinev Botanic Garden, from Republic of Moldova.

The Association is coordinating a project to identify “Important Plant Areas in Romania”. It is contributing, also, to other pan-European projects through a grassland inventory in Romania and a list of macrophytes of the Danube Delta and its tributaries.

Botanical gardens are connected, usually, with a University from their area, and contain collections of plants for education and scientific purposes. Through field, seed or tissue culture units these institutions have conservation responsibilities.

They hold living collections, which can be considered as field genebank, or seed genebank or both, depending on the conservation method being used. Most of the germplasm conserved in botanical gardens do not belong to the plant genetic resources for food and agriculture, their conservation efforts being concentrated on wild, ornamental, rare and endangered species.

The organization can be different, but commonly in the Romanian botanical gardens a Greenhouse Complex can't be found, and some specific areas (Taxonomical, Biological, Ornamental and the Dendrological sections), together with Flora of Romania, World Flora, Didactic-Experimental and the Recreation sectors.

Every year they publish “Index seminum” based on what the institutes carries out, seed exchanges with hundreds similar institutions from other countries. The seed catalogues comprise seeds collected from open pollinated plants cultivated in the botanical gardens, selected from the wild in different parts of Romania, or in expeditions organized abroad with other partners. The material can be used for research, education, conservation and the development of botanic gardens, and must not be passed to other parties without permission.

Very old herbariums with thousands sheets of dried plants, exposed after ecological or systematically criteria, can be found at every institution and used to study the Romanian flora dynamics. Preserved plants specimens from all over the world were received through exchange with similar units.

They organize, every year, scientific meetings having national or international participation. The results of the research activity are published in specialized magazines and catalogues.

3.8 Supporting and extending of *ex situ* collections

The staff of genebank works hard to improve the needed facilities in order to get a representative and high quality of collections with maximum potential of viability. The equipment renewing and the completion of specific endowment are the uppermost preoccupations year by year.

Extending the number and the inter- & intra-specific genetic diversity of collections through biologic resources coming from collecting missions, taking over breeding collections, and exchanges with different stakeholders from Romania or foreign countries impose, also, efforts and planning measures.

Plant genetic resource networks organized at the international level favour, also, the supporting and extending of *ex situ* activities through the exchange of information and of plant material. They are important to support global initiatives on PGR conservation, and the development of national programmes in the area. Sharing of responsibilities for conservation is more and more in debate for these international associations in which Romania participates.

Suceava Genebank promotes research on the genetic diversity, both in the wild and local landraces, and on some social, cultural and economic factors that have impact on plant diversity. The results should be well understood and

utilized to improve conservation actions, enhance the human resources, and the necessary financial support for plant security, for farming practices to promote biodiversity valorization.

3.9 An assessment of major *ex situ* conservation needs

The monitoring and evaluation of major *ex situ* needs and progress could be related to the Romanian PGR Programme and Genebank's objectives and activities.

The necessity of a better collaboration between genebank and all stakeholders should be underlines.

Increasing the present budget line for national genebank to achieve the completion of specific genebank endowment can be useful in:

- Molecular analyses of conserved samples;
- Establishing a safety base collection;
- Reduce the backlog of accessions which need to be regenerated;
- Update the national database and assure the on line access to all registered information;
- Get a better representation of wild crop relatives in the collections;
- Training course in collecting domain is desired, especially for wild crop relatives and spontaneous flora;

Further development of criteria and indicators will be essential to enable more comprehensive assessments of major *ex situ* needs.

Awareness increasing and training of stakeholders, particularly at the community level, can remote "conservation for use" in future breeding activities, traditional agro-systems and echo-tourism. Dissemination of information and experience needs to be improved, too.

USE OF PLANT GENETIC RESOURCES IN ROMANIA

The basic use of cultivated plants is in human and animal nutrition and as raw material in food industry. The potential of plant genetic resources is unlimited because of multiple uses in various fields and industries.

The germplasm fund of our country is represented by the existing biological material in *ex situ* and *in situ* collections that have been developed along time under natural and/or artificial pressure. This includes wild forms, landraces, varieties removed from culture, modern varieties and hybrids, genetic material under improvement etc., which are used directly in production or are used in different research programs.

4.1 Utilization ways of genetic resources

4.1.1 The characterization and evaluation of national germplasm

In our country, work on evaluation of the plant genetic resources is carried out in the breeding institutions and in Suceava Genebank. The institutes and agricultural research stations use UPOV descriptors, while the Genebank uses a minimum number of descriptors, developed on the basis of IPGRI lists and completed with traits of interest to breeders.

A summary of evaluation activity undertaken by the Genebank's staff is shown in table 7.

TABLE 7

Evaluation of germplasm fund in some plant species conserved in the National Genebank

No crt	Genus	No of accessions	Evaluated samples		The biological statute of evaluated accessions				
			No.	%	Advanced cultivars	Inbred lines	Land-races	Synthetic	Other forms
1	<i>Triticum</i> sp.	1 323	414	12.7	117	234	58	-	5
2	<i>Hordeum</i> sp	929	318	8.1	65	197	40	-	16
3	<i>Avena</i> sp.	182	59	29.3	1	3	55	-	-
4	<i>Zea mays</i>	4 778	997	13.6	29	163	796	8	1
5	<i>Phaseolus</i> sp.	2 797	264	8.6	263	1	-	-	-
6	<i>Vicia</i> sp.	817	241	29.4	20	36	185	-	-
7	<i>Solanum tub.</i>	154	27	4.0	1	-	26	-	-
8	<i>Linum</i> sp.	633	483	13.6	332	124	27	-	-
x	Total	11 613	2 803	x	828	758	1 187	8	22



The assessment of fruit trees genotypes have been performed since germplasm collections were established in the fruit tree institutions and breeding stations. The studies were focused on both tree characteristics (vigour, blossom period, frost, drought, and disease resistances), and fruits descriptors (size, shape, taste or processing quality) as the basis for determining agrobiologic behaviour and adapting capacity to cultivation areas or to use the sources as genitors in hybridization work. Data presented in Annex 10 reveal that from 5 705 accessions, 3 128 samples belonging to 47 species, out of which 2 125 are foreign varieties and 1 143 local varieties were evaluated.

4.1.2 The breeding of the plant genetic resources

In Romania, the breeding activity is coordinated by six research institutes, each of them coordinating a number of agricultural research stations (Annex 11). In the last 10 years, reorganizations have been made, many stations have been transformed into commercial companies, and most part of the land was taken over by the old owners by effect of the Law 18/1990 and the Law 267/2005. Thus, many research units were dissolved, and as the result the significant plant genetic resources collections were lost.

In Romania the currently used breeding methods applied in case of self pollinating and cross pollinating plant species are mainly classical methods such as:

- Selection of the initial material;
- Inbreeding;
- Cross-breeding;
- Selection in the fields of hybrids;
- Exploitation of the heterosis phenomenon;
- The study of crops in the comparative fields;
- The study in comparative orientation and competition crops.

Along with classical methods used in some breeding units, modern biotechnology (meristeme cultures "*in vitro*") are used for strawberry, different species of flowers and potato. Biotechnology offers the following opportunities versus classical methods:

- Induction of the somaclonal variability;
- Maintaining of the genetic stability;
- Obtaining of the virus free forms;
- Multiplication of valuable genotypes obtained through classical breeding.

The situation of plant genetic resources obtained through breeding programs is quantified in the number of varieties and hybrids produced and tested for registering into the official national catalogue. From the 831 varieties entered the list, 463 are Romanians, that have been created during the 2003-2007 years, being distributed on the following crop categories: 7.5% in cereals, 4.1% oil and textiles, 3.2% tuber and root crops, 6.4% fodder plants, 44.4% vegetable species, 17.7% ornamentals, 14.6% fruit trees and 1.7% vine (Annex 12).

The low number of modern varieties created in the last period, and the introduction of foreign species with a narrow genetic basis, and poor adapted to the weather conditions in our country, has led to the diminishing of diversity and stability of yields.

In domain of fruit trees growing, in the last years, the breeding work was concentrated on observations and analysis effectuated in the collections, and potential genitors for many different characters and traits in order to be used in controlled intra-specific and inter-specific cross-breeding have been identified. In this line it is the list containing over 320 of newly created native varieties and 52 of rootstocks with improved traits, introduced in the official list for propagation in production (table 8).

TABLE 8

New varieties of trees, small fruits, strawberry, rootstocks and dendrologic plants created and approved in Romania (1966-2005)

No. crt.	Species	Homologated varieties			Homologated rootstocks		
		Total	1967-1991	1992-2005	Total	1966-1991	1992-2005
1	Apple	43	22	21	7	4	3
2	Pear	24	12	12	2	1	1
3	Quince	3	3	-	1	1	-
4	Plum	36	23	13	17	11	6
5	Apricot	31	17	14	3	1	2
6	Peach + nectarine	34	13	21	8	4	4
7	Almond	1	1	-	1	1	-
8	Sweet cherry	32	15	17	4	3	1
9	Cherry	18	14	4	4	2	2
10	Walnut	27	14	13	3	2	-
11	Chestnut	7	7	-	2	2	-
12	Hazelnut	5	3	2	-	-	-
13	Strawberry	13	1	12	-	-	-
14	Red currant	13	5	8	-	-	-
15	Gooseberry	3	3	-	-	-	-
16	Raspberry	5	-	5	-	-	-
17	Blueberry	7	-	7	-	-	-
18	Sweet briar	2	1	1	-	-	-
19	Bramble	2	-	2	-	-	-
20	Elderberry	4	3	1	-	-	-
21	Tamarisk	1	1	-	-	-	-
22	Rose	9	7	2	-	-	-
	Total	320	165	155	52	32	20

The passport data on the genetic pool of existing fruit trees collections in Romania, are included in European Database (EURISCO), hosted and managed by Bioversity International.

In the period of 2002-2006, due to the lack of financial support and inappropriate storage facilities many collections have suffered numerous losses and degradations. But, since the autumn of 2006, by including fruit collections under funding projects, it has been created the possibility to support the institutions dealing with fruit genetic resources in the period immediately ahead.

4.2 Seed production in Romania

The main measures taken in seed production in last years are:

- Maintaining standardized varieties or hybrids for cultivation;
- Ensuring the possible requirements of annual seeds for all categories, such as biological seeds value, agricultural state and high health status;
- Ensuring the possible requirements of annual seeds for all categories, such as biological renewal of seed production units to make only first seed multiplication and hybrid first seed generation.

In the context of the Romanian market, aligning the seed requirements of the European Union, CPVO (Community Plant Variety Office) standards and criteria and the UPOV (International Union for the Protection of New Varieties of Plants) guide varieties and hybrids, should met the following characteristics: distinguishable, uniformity and stability.

In Annex 13, there are presented some data on the dynamics of production and export of seeds in Romania.

Planted and seed materials that are produced and maintained in the institutes and research stations, and in companies owned by the state or private are listed in Annex 14.



At the national level, operators, physical and legal persons, registered as seed producers, are financially supported by government laws to produce seed in the pre-basic, basic and certified categories.

The breeders or curators of the varieties are required to provide operators multiplying the varieties, the appropriate production technologies for each biological links.

NATIONAL PLANT GENETIC RESOURCES PROGRAM (NPGRP)



In Romania plant genetic activities are implemented through a non-formal sectorial PGR Program, in which are involved many institutions (research institutes and breeding stations, universities, botanic gardens, national genebank), each of them having special expertise in various fields of conservation and utilization.

Mandate

The major role of the National Program on PGRFA is to contribute to the national development, food security, agriculture development through plant diversity conservation and utilization. Varied ways of collaboration at regional and international levels constitute, as well as,

Activities

- “*In situ*” and “*ex situ*” conservation
- Inventorying, exploring and collecting
- Characterization and evaluation
- Plant breeding
- Seed production and distribution
- Documentation
- Research
- Teaching and education
- Legislative initiatives
- Raising awareness, at all levels, on the importance of plant genetic resources conservation and utilization.

Organizational structure

Operating segment consists of the following most important institutions working with plant genetic resources:

- **Genebank of Suceava** is responsible for keeping in long- and medium-term conservation conditions the national collection for all seed propagated plants. It is mandated to coordinate at the national level all PGR activities, as well as, the genebank hosts and manages the National PGR Database.

Contact details: Silvia Strajeru, address - B-dul 1 Decembrie 1918, nr. 17, 5800, Suceava
 Phone /fax number: +40 230521016
 e-mail: genebank@assist.ro

- **Fruit Growing Research and Development Institute Maracineni** is maintaining and managing the national collection for fruit trees & shrubs, and strawberry. Eleven research and development stations are led by the institute. All species in the collection are kept as “field collection”, excepting *Fragaria* sp. and *Rubus* sp. that are conserved “*in vitro*”.

Contact details: Nicolae Braniste, address - Comuna Mărăcineni, cod 0300, Județul Argeș
 Phone number: +40 248278519
 Fax number: +40 248278292
 e-mail: icpp_mar@geostar.ro

- **Viticulture and Vinification Research and Development Institute Valea Calugareasca** manages the national *Vitis* sp. resources and coordinates the activities of ten research stations. The collection is preserved as "field collection".

Contact details: Marius Stoian, address - Comuna Valea Călugărească, 2040, Județul Prahova
 Phone number: +40 244235351
 Fax number: +40 244236389
 e-mail: icvv.vie.vin@xnet.ro

- **Agricultural Research and Development Institute Fundulea** has under coordination 9 research stations, and manages the breeding collection for cereals and industrial crops.

Contact details: Liliana Vasilescu, address - Strada N. Titulescu, nr.1, Fundulea, cod 8264, judetul Calarasi
 Phone number: +40 242642875
 Fax number: +40 2423110722
 e-mail: fundulea@ricic.ro

- **Grassland Research and Development Institute Brasov** is the leading institute for other three research stations, and maintains grasses breeding collection.

Contact details: Teodor Marusca, address - Str. Cucului, nr.5, 2200, Braşov
 Phone /fax number: +40 268475295
 e-mail: pajisti@brasovia.ro

- **Potato & Sugar-beet Research and Development Institute Brasov** with its four stations is in charge to conserve the national potato and sugar-beet collections, stored either as "field clones" for the first species, or as seed for the second one. The institute does not have special facilities to store the seed accessions.

Contact details: Ion Bozesan, address - Str. Fundăturii, nr.2, 2200, Braşov
 Phone number: +40 268474647/+40 268475414
 Fax number: +40 268476795
 e-mail: icpc@potato.ro

- **Vegetable and Flower Growing Research and Development Institute Research and Development Institute Vidra** coordinates five stations and is hosting the national vegetable breeding collection.

Contact details: Mihaela Valeanu, address - Localitatea Vidra, Judetul Ilfov, cod 8268
 Phone number: +40 214680796/+40 214680795
 Fax number: +40 214680794
 e-mail: inclf.@totalnet.ro

- **Forest Research and Development Institute Bucuresti** manages the national forest genetic resources.

Contact details: Ioan Blada, address - Şoseaua Ştefăneşti, nr.128, sector 2, of.postal 11, cod 72904, Bucureşti
 Phone number: +40 212405860/+40 212406095
 Fax number: +40 212406845
 e-mail: icas@icas.ro

- **Commission for Natural Monuments Conservation** is responsible for wild genetic resources conservation present in natural reserves.

Contact details: Simona Mihailescu, address - Academia Româna, Comisia pentru monumentele naturii, Calea Victoriei, 125, sector 1, cod 71102, Bucuresti
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Fax number: +40 212116608
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Other **six agricultural and biological universities**, and **6 botanical gardens** work with PGR collections, that are maintained for teaching, research or educational purposes.

At the highest level of coordination are two ministries and Romanian Academy. Genebank of Suceava and research institutes are under the leadership of the Ministry of Food, Agriculture and Forests, natural reserves under Romanian Academy, while universities and botanical gardens are subordinated to the Ministry of Education and Research.

As consulting segment is the National Committee on PGR, that was established in 1995, and is comprised of 17 members representing the main institutions holding PGR collections.

All mentioned institutions are governmental, the private sector being still absent from plant genetic resources conservation. As regards NGOs there are some involved in wildlife conservation in natural reserves.



THE STATE OF REGIONAL AND INTERNATIONAL COLLABORATION

In the last 10 years, there were close collaboration with international or regional organizations (FAO, ECP / GR, IPGRI, ICARDA, SAVE, SEEDNet), botanic gardens and gene banks in Sweden, Germany, the Netherlands, Syria, Russia, Hungary, Turkey, Poland etc.

6.1 International networks

The Suceava Genebank takes the responsibility to conserve the Romanian plant germplasm and, through international collaboration, contributes to the safeguard of the world genetic resources. The Suceava Genebank is trying, by different ways and means, to develop relationships with governmental and non-governmental organizations and institutes in the field, both inside and outside of the country. The following objectives were achieved through collaboration at the national or international levels:

- Strengthen national plant genetic resources program;
- Exchange information and experiences related to plant genetic resources conservation and utilization;
- Promote the collection, evaluation, utilization and conservation of existing plant genetic resources in Romania;
- Promote collaborative research;
- Identify and promote opportunities for collaboration and training and capacity building at the national, sub-regional and regional levels;
- Promote the participation at the sub-regional and regional projects.

Many of the above objectives were promoted through the regional or sub-regional PGR networks, such as:

- ECP/GR (European Cooperative Program for Crop Genetic Resources). The program operates through crop specific working groups. Currently, Romania is active member in twelve crop working groups;
- SAVE – (Safeguard of rare plants and animals useful for agricultural and food). During 3 years (1997-1999) this NGO with four Carpathian countries (Romania, Poland, Ukraine and Slovakia) have carried out monitoring of species of rare plants and animals from Carpathian Mountains;
- SEEDNet (South East European Development Network on Plant Genetic Resources) has presently the following 12 signatory partners: Albania, Bulgaria, Croatia, Federation of Bosnia & Herzegovina, Kosovo, Macedonia, Moldavia, Montenegro, Romania, Republic of Srpska, Serbia, Slovenia. The core of the network consists of seven specific Working Groups (cereals and maize, medicinal and aromatic plants, vegetables, fruit crops and *Vitis*, fodder crops, industrial crops, documentation) which take responsibilities for issues related to specific crops and themes develop projects and activity proposals and make recommendations for consideration by SEEDNet Steering Committee. The program is financially assisted by SIDA (Swedish International Development Cooperation Agency) and CBM (Swedish Biodiversity Centre) is the executing agency.

6.2 Conventions and International Treaties

According to the Constitution of Romania, through ratification or accession conventions and international treaties, become part of national law (domestic law).

In the field of nature conservation, the following treaties/conventions/ agreements are in force:

- Convention on the protection of world heritage, cultural and natural adopted by the General Conference of the United Nations Organization for Science and Culture at 16 November 1972, supported by Decree 187/1990, respecting state sovereignty on the territory of which the natural heritage and / or cultural and rights under

national law, States parties recognize the universality of the assets to which conservation should cooperate entire international community.

- Convention on wetlands of international importance, especially as a habitat of aquatic birds, signed in Ramsar, on 2 February 1971, ratified by Law no. 5 / 1991, aims to designation by the contracting parties of these areas of international importance ecologically botanical, zoo, limnology or hydrological conditions and ensuring of appropriate conservation. The Danube Delta is declared Ramsar site.
- Convention on the conservation of wild life and natural habitats in Europe, adopted in Berne on September 19, 1979, which Romania joined by Law no. 13/1993 aims to ensure the conservation of species of wild flora and fauna and their natural habitats, which requires cooperation in this respect of more countries.
- The Convention on Biological Diversity adopted at Rio de Janeiro on 5 June 1994, ratified by Law no. 58/1994. Defining objectives of the Convention are the conservation of biological diversity and sustainable use of its components, fair and equitable sharing of benefits arising from genetic resources exploitation, particularly through access to and transfer of technology.

Generally, the conservation and the sustainable utilization measures are provided for the development of strategies, plans or programs or national adaptation of existing alongside the integration of conservation and sustainable use of biological diversity in the plans, programs, sectorials or intersectorial pertinent politics.

- Convention on International Trade in Endangered Species of Wild fauna and flora about disappearing, adopted in Washington on 3 March 1973, which Romania joined by Law 69/1994 ensure the protection of endangered species by regulating trade.
- Convention on Desertification Combating, adopted in Rio de Janeiro on 5 June 1994, ratified by Law 111/1998.

6.3 Assessment the need of the development of international cooperation

International cooperation is essential to the conservation of global plant genetic resources for agriculture and food.

To develop international cooperation, it is necessary to achieve national strategies and plans of action for the purpose of conservation and sustainable use of their genetic resources, so that we can be active partners in the partnership at regional or sub regional levels.

An important point in the development of cooperation must be the integration of *"in situ"* and *"on-farm"* conservation of plant genetic resources in sustainable management of natural resources.

Involving staff from research agricultural institutions and gene bank in national or regional working groups will lead to a better use of plant genetic resources and by default to the global conservation of them.

Non-governmental organizations should be involved in development cooperation at regional and sub regional levels (the Balkans, central Europe, South East Europe), in the collection, evaluation, characterization and documentation of plant genetic resources in these areas of interest.



ACCESS TO PLANT GENETIC RESOURCES

At the national level the responsibilities for conservation, utilisation and facilitated access to plant genetic resources are shared between different governmental institutions that are under the leadership of the following three highest level central bodies: Ministry of Agriculture and Rural Development, Ministry of Environment and Sustainable Development, and Ministry of Education, Research and Youth.

In order to answer in a coherent manner to the need of exchange the genetic material and to facilitate the access to genetic pool conserved *in situ* or *ex situ*, Romania subscribed to international conventions and agreements, taking into consideration, as well as, the national interests. Thus, the Convention for Biological Diversity provides the general legal frame for the conservation of autochthonous germplasm fund, while the access to plant genetic resources with the aim of breeding and research is guaranteed.

Being convinced that each nation depends, not only, on the own resources, but very largely on plant genetic resources originated elsewhere, Romania signed in 2005 the International Treaty for Plant Genetic Resources for Food and Agriculture. In this line, now we are under way in identifying and adopting the most appropriate measures to implement the Treaty's provisions, and to comply with Art. 12 on the access to plant genetic resources and sharing of benefits resulted from their utilization. Such, the access to genetic material belonging to Annex 1 species is to be facilitated under the Multilateral System of the International Treaty, by using sMTA. Accessions acquired after the entry into force of the Convention for Biological Diversity will be provided to different users by complying with the CBD regulations. Access to the non-listed crops in Annex 1, and acquired before entry into force of the CBD will be made available according to national legislation.

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- Ministry of Agriculture and Rural Development
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- Romanian Academy of Sciences
- The State Institute for Variety Testing and Registration, Romania



USE OF AGRICULTURAL LAND, 1996-2005

thou. ha

Indicators	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total agricultural surface of which:	14788,7	14794	14801,7	14730,7	14856,6	14852,3	14836,6	14717,5	15365,6	15475,2
Arable surface	9338,9	9341,4	9350,8	9358,1	9381,1	9401,5	9398,5	9414,3	9782,9	9787,4
Land	3391,7	3409,8	3402,7	3322,8	3441,7	3421,4	3424,0	3354,9	3584,4	3595,2
Hay field	1498,5	1490,8	1503,4	1512	1507,1	1510	1513,6	1490,4	1563	1547,1
Vine and vineyard	289,0	286,3	281,8	281,1	272,3	267,4	259,6	230,5	230,0	232,9
Orchard fruit growing	270,6	265,7	263,0	256,7	254,6	252,0	240,9	227,2	226,0	232,7

THE SITUATION OF THE MAIN CULTURES AT NATIONAL LEVEL DURING THE PERIOD 1996-2005

thou. ha

Specifications	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total arable area of which:	8878,8	9059,8	8972,6	8493,9	8499,9	8905,0	90001,6	8880,6	8527,8	8467,9
Bean cereals of which:	5842,8	6319,8	5920,6	5370,7	5655,2	6294,9	6038,1	5541,8	6265,4	5856,7
Grain and rye	1797,7	2424,4	2033,4	1686,9	1954,3	2558,6	2309,8	1748,0	2317,8	2496,7
Barley	515,4	626,5	517,2	415,5	411,9	528,8	578,8	329,6	424,5	484,6
Oat	233,9	219,1	228,1	248,2	232,3	519,4	239,4	242,3	207,5	214,8
Corn	3277,0	3037,7	3128,9	3013,4	3049,4	2974,0	2894,5	3199,6	3274,1	2628,5
Sorgh	7,3	5,3	7,2	1,7	1,6	6,2	2,8	6,9	8,7	1,5
Rice	8,5	4,0	1,7	1,6	1,4	1,2	0,5	0,1	1,2	3,9
Bean vegetables of which:	67,2	53,1	44,7	46,1	41,3	35,6	45,3	46,8	38,6	44,2
Peas	27,7	22,0	14,0	15,6	13,1	11,7	16,1	18,8	24,5	22,0
Beans	37,8	29,9	29,2	28,1	26,2	21,5	27,0	27,3	13,8	21,8
Technical plants	1191,3	1039,3	1323,5	1338,3	1137,5	1003,5	1144,6	1448,4	1221,0	1220,9
Textile plants of which:	5,6	3,1	3,4	1,6	0,9	0,9	1,4	1,6	1,5	2,3
Fiber flax	2,3	0,8	0,3	0,3	0,4	0,3	0,4	0,4	0,3	0,2
Oily plants of which:	1012,1	871,5	1156,1	1244,3	1067,4	938,6	1076,4	1377,1	1197,5	1205,5
Sunflower	916,8	780,7	962,2	1043,0	876,8	800,3	906,2	1188,0	977,0	971,0
Rape	1,7	7,2	25,3	83,6	68,4	82,4	74,6	17,1	49,7	87,8
Soybean	80,2	63,1	147,3	99,8	117,0	44,8	71,8	128,8	121,3	143,1
Oil flax	7,3	9,4	2,7	2,0	1,3	1,2	2,2	1,6	1,4	0,1
Plants for other industries of which:	151,1	147,4	136,3	82,5	64,9	54,0	56,2	57,4	22,0	15,4
Sugar beet	135,9	128,8	117,8	65,5	48,4	39,0	41,6	45,2	20,8	25,2
Medicinal and aromatic plants	22,5	17,3	27,7	9,9	4,2	10,0	10,6	12,3	9,1	4,6
Potatoes	257,0	222,9	229,3	238,5	246,5	241,6	246,7	247,5	238,0	250,2
Vegetables of which:	224,0	208,3	223,2	233,1	234,0	229,2	236,3	241,9	308,2	266,7
Tomatoes	46,2	44,0	47,7	47,5	47,6	45,9	48,3	49,3	58,5	47,1
Dry onion	35,9	33,2	36,4	37,3	37,1	37,1	38,0	36,9	28,3	35,7
Dry garlic	13,1	12,9	13,6	14,9	14,8	14,7	15,0	14,8	8,7	12,4
Cabbage	33,8	33,8	37,4	38,8	39,5	39,8	40,4	42,2	42,1	54,8
Green peppers	18,0	17,4	18,3	20,0	19,1	17,9	19,2	20,0	18,1	19,0
Edible roots	22,1	22,1	22,9	24,2	24,5	24,2	24,7	25,2	-	-
Water melons and melons	48,9	42,1	44,4	49,5	46,2	38,9	43,4	42,3	37,8	37,2
Fodder crops	1222,6	1113,0	1128,7	1157,9	1083,3	1011,4	1193,9	1263,1	558,4	820,4



AVERAGE YIELD FOR MAIN CROPS DURING PERIOD 1996-2005

Specifications	Kg/ ha									
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Wheat	2050	2864	2561	2860	2286	3038	1924	1429	3403	2965
Rye	1760	1640	1860	1851	1549	2326	1636	1356	2511	2371
Barley and two row barley	2149	3016	2394	2451	2105	2988	2005	1641	3312	2227
Oats	1242	1485	1588	1570	1050	1743	1368	1334	2154	1757
Maize grains	2926	4171	2756	3627	1603	3066	2902	2993	4441	3952
Sorgh	587	905	1569	1503	923	899	916	722	3270	1304
Rice	2707	2677	2979	2432	2495	1263	1284	2410	4006	3634
Peas	1218	1241	1737	1730	1082	1848	1266	1249	2364	1776
Dried beans	687	1032	1046	1064	580	1040	838	895	1178	1236
Autumn potatoes	13949	12531	12583	14434	12684	14805	14976	14417	16046	13085
Sugar beet	14464	12747	12837	14744	13787	22432	22930	16916	32290	28932
Sunflower	3987	4134	4186	3600	821	1029	1105	1268	1595	1381
Soybean	1410	1920	1364	1838	594	1623	2033	1746	2462	2186
Tomatoes	14213	9988	13801	14111	13121	14141	13599	16535	22743	13302
Dry onion	8509	10139	10036	10149	7990	10686	8979	9495	11771	10198
Green pepper	10193	9594	10404	10557	9153	10318	10264	12426	13106	10736
Cabbage	20296	11906	18905	19684	18479	20550	20303	24130	21831	18406
Fodder plants	17334	18889	17771	18223	8983	11654	10858	10484	10813	10451

MINOR AND UNDERUTILIZED SPECIES IN ROMANIA

Nr. crt.	Species	Form and use	Cultivation/use	On farm status	Ex situ status	Breeding program	Harvested surfaces (ha)	Weakness	Priorities
1	<i>Lupinus spp.</i>	Annuals. High protein food, forage and oil crops. Insecticidal usage and in other industries	Cultivated in the dry areas from south of Oltenia and western part of Transilvania Plateau.	Forage crop. No real threat of genetic erosion	Most of accessions are advanced cultivars and landraces which are maintained in national genebank	No systematic breeding work for multipurpose	500	lack of plant breeding ideotypes	Germplasm collections from unexplored areas
2	<i>Ricinus communis</i>	Annuals. Industrial oil, purgative, seeds as medicine, cosmetics.	Cultivated in south of country	Industrial crop. The real threat of genetic erosion.	Most of accessions are kept in the breeding institutions.	There is one breeding station in south of country. In the last 10 years was created 3 advanced cultivars.	300	lack of interest	Germplasm maintained in the controlled conditions
3	<i>Brassica napus var oleifera</i>	Vegetable and industrial forage.	Cultivated in south and south eastern of country	At present mostly grown in small plots. No specific on farm conservation program	Most of accessions are kept in the National Institute for Vegetable, of Vidra	No systematic breeding work for multipurpose	5000	lack of plant breeding ideotypes	Germplasm maintained in the controlled conditions
4	<i>Carthamus tinctorius</i>	Vegetable oil, purgative, foliage as medicine, cosmetics.	Cultivated in the dry areas, on soils with low fertility.	At present mostly grown in small plots. No specific on farm conservation program	Most of accessions are maintained in national genebank.	No systematic breeding work for multipurpose	10	lack of interest	Germplasm collections from unexplored areas
5	<i>Cannabis sativa</i>	Seeds for industrial oil. Stem is used for textile industries. Flowers are used in medicine.	Cultivated in west and north west of country.	Industrial crop. The real threat of genetic erosion.	Most of accessions are maintained in national genebank.	No breeding program.	1000	lack of interest	Germplasm collections from unexplored areas
6	<i>Cichorium</i>	Roots for food	Cultivated in	At present	Most of	No breeding	100	lack of interest	Germplasm



	<i>intibus</i>	and for medicine.	the Transilvania Plateau.	mostly grown in small plots	accessions are maintained in small farms.	program.		collections from unexplored areas
7	<i>Humulus lupulus</i>	Female flowers are used in the food industry and medicine.	Cultivated in the western part (populations in Alba, Cluj and Hunedoara).	At present there are specialized farms in hop growing in the Transilvania Plateau	Most of accessions are studied and maintained at the Agricultural University of Cluj	No breeding program.	450	Germplasm maintained in the controlled conditions, genetic enhancement to improve the crop. lack of plant breeding ideotypes
8	<i>Fagopyrum esculentum</i>	Erect, annual flour, pancakes, honey and medicinal plant.	Cultivated in the northern part of Moldavia	Small scale production in hill farming. No on farm conservation program	Most of accessions are maintained in the small farms.	No breeding work.	500	Germplasm collections from unexplored areas and maintained in the controlled conditions
9	<i>Cicer anethinum</i>	Seeds are used in the food industry	Cultivated in the dry areas, on soils with low fertility from the southern part of country	Small scale production in plains farming. No on farm conservation program	Most of accessions are maintained in the small farms.	No breeding work.	200	Germplasm collections from unexplored areas and maintained in the controlled conditions
10	<i>Vicia faba</i>	Seeds are used for food and fodder	Cultivated in the northern part of Moldavia and in the Transilvania	Small surfaces in the mountain areas, near the houses. The real threat of genetic erosion.	Most of accessions are maintained in the national genebank	No breeding work.	150	Germplasm collections from unexplored areas, evaluation of local landraces, diseases studies.
11	<i>Vigna unguiculata</i>	Seeds are used for food and fodder	Cultivated on the sandy soils in the county Dolj.	Small surfaces in the farms with sandy soils. The real threat of genetic erosion.	Most of accessions are maintained in field collections. Few accessions are kept in the controlled conditions	No breeding work.	50	Maintenance of indigenous varieties, increased utilization
12	<i>Multipurpose medicinal plants</i>	Of the 52 species of herb plants and bushes are cultivated for medicinal and aromatic purposes.	Spread in all parts of country, varied from species to species.	Not well reported	Filed collections in the research institutions and agricultural universities. Few accessions are kept in the controlled conditions	Very little breeding work.	Not well reported	Germplasm maintained in the controlled conditions.
13								

LIST OF WILD PLANTS WITH ACTUAL OR POTENTIAL VALUE FOR FOOD AND AGRICULTURE



Nr ort.	Genus	Taxa	Utilization	Endangering
1	<i>Achillea</i>	<i>millifolium</i>	medicinal plant	potentially endangered
2	<i>Aconitum</i>	<i>napellus</i>	medicinal plants or spices	Species with unknown degree of endangering
3	<i>Adonis</i>	<i>vernalis</i>	medicinal plants with basic substances for cosmetics use.	Species with unknown degree of endangering
4	<i>Agrimonia</i>	<i>eupatoria</i>	medicinal plants with basic substances for cosmetics use.	Species with unknown degree of endangering
5	<i>Agrostis</i>	<i>gigantea</i>	Fodder plants	Occurrence not endangered
6	<i>Agrostis</i>	<i>tenuis</i>	Fodder plants	Occurrence not endangered
7	<i>Agrostis</i>	<i>alba</i>	Fodder plants	Occurrence not endangered
8	<i>Agrostis</i>	<i>stolonifera</i>	Fodder plants	Occurrence not endangered
9	<i>Agrostis</i>	<i>alba</i>	Fodder plants	Occurrence not endangered
10	<i>Amaranthus</i>	<i>retroflexus</i>	wild vegetables	Occurrence not endangered
11	<i>Amaranthus</i>	<i>hybridus</i>	ornamental plants	Species with unknown degree of endangering
12	<i>Amaranthus</i>	<i>cruentus</i>	ornamental plants	Species with unknown degree of endangering
13	<i>Amygdalus</i>	<i>nana</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees	Occurrence not endangered
14	<i>Angelica</i>	<i>archangelica</i>	medicinal plants or spices	Occurrence not endangered
15	<i>Anthemis</i>	<i>tinctoria</i>	medicinal plants or spices, ornamental plants and lawn grasses, technical crops (high fibre content)	Occurrence not endangered
16	<i>Arnica</i>	<i>montana</i>	medicinal plants or spices, donor plant of nectar or pollen	Occurrence not endangered
17	<i>Arrhenatherum</i>	<i>alatum</i>	Fodder plants, lawn grasses	Occurrence not endangered
18	<i>Atropa</i>	<i>bella dona</i>	Medicinal plants, with basic substances for cosmetics use.	Occurrence not endangered
19	<i>Barberis</i>	<i>vulgaris</i>	Medicinal plants	Occurrence not endangered
20	<i>Brassica</i>	<i>nigra</i>	medicinal plants or spices	Occurrence not endangered
21	<i>Bromus</i>	<i>erectus</i>	Fodder plants	Occurrence not endangered
22	<i>Bromus</i>	<i>inermis</i>	Fodder plants, plant for protection against soil erosion or soil improvement, lawn grasses	Occurrence not endangered
23	<i>Camelina</i>	<i>sativa</i>	Plant with high oil or fat content , donor plant of nectar or pollen	extinct or missing
24	<i>Cannabis</i>	<i>sativa</i> var. <i>spontaneum</i>	medicinal plants, technical crops (species with high fibre content)	threatened by extinction
25	<i>Castanea</i>	<i>sativa</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees, plants with high oil and starch contents, medicinal plant	Occurrence not endangered
26	<i>Centauria</i>	<i>cyaneus</i>	medicinal plants, ornamental plants	endangered
27	<i>Cerasus</i>	<i>avium</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees, for protection against soil erosion or soil improvement	Occurrence not endangered
28	<i>Chenopodium</i>	<i>album</i>	wild vegetables , plant with high starch content	Occurrence not endangered
29	<i>Colchicum</i>	<i>autumnale</i>	medicinal plants, ornamental plant	endangered
30	<i>Cichorium</i>	<i>intibus</i>	wild vegetables , medicinal plants	Occurrence not endangered
31	<i>Convolvulus</i>	<i>arvensis</i>	medicinal plants	Occurrence not endangered
32	<i>Coronilla</i>	<i>varia</i>	plant for protection against soil erosion or soil improvement, fodder plant, medicinal plant	Occurrence not endangered

33	<i>Cornus</i>	<i>mas</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees, plant for protection against soil erosion	Occurrence not endangered
34	<i>Cornus</i>	<i>sanguinea</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees, plant for protection against soil erosion	Occurrence not endangered
35	<i>Corylus</i>	<i>avalana</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees, plant for protection against soil erosion	Occurrence not endangered
35	<i>Crataegus</i>	<i>monogyna</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees, medicinal plants,	Occurrence not endangered
36	<i>Cynodon</i>	<i>dactylon</i>	Fodder plants, medicinal plants, plant for protection against soil erosion	Occurrence not endangered
37	<i>Dactylis</i>	<i>glomerata</i>	Fodder plants, lawn grasses	Occurrence not endangered
38	<i>Dactylis</i>	<i>polygama</i>	Fodder plants	Occurrence not endangered
39	<i>Datura</i>	<i>innaxia</i>	medicinal plant	Occurrence not endangered
40	<i>Datura</i>	<i>stramonium</i>	medicinal plant	Occurrence not endangered
41	<i>Deschampsia</i>	<i>caespitosa</i>	plant for protection against soil erosion, lawn grasses	Occurrence not endangered
42	<i>Deschampsia</i>	<i>flexuosa</i>	plant for protection against soil erosion, lawn grasses	Occurrence not endangered
43	<i>Dianthus</i>	<i>carthusianorum</i>	lawn grasses	Occurrence not endangered
44	<i>Digitalis</i>	<i>lanata</i>	medicinal plant or spices	Occurrence not endangered
45	<i>Eryngium</i>	<i>planum</i>	medicinal plant, lawn grasses	threatened by extinction
46	<i>Festuca</i>	<i>gigantea</i>	Fodder plants, lawn grasses	Occurrence not endangered
47	<i>Festuca</i>	<i>arundinacea</i>	Fodder plants, lawn grasses, plant for protection against soil erosion	Occurrence not endangered
48	<i>Festuca</i>	<i>ovina (supina)</i>	Fodder plants, lawn grasses, plant for protection against soil erosion	Occurrence not endangered
49	<i>Festuca</i>	<i>vaginata</i>	Fodder plants, lawn grasses, plant for protection against soil erosion	Occurrence not endangered
50	<i>Filipendula</i>	<i>hexapetala</i>	medicinal plant, fodder plants.	Occurrence not endangered
51	<i>Fragaria</i>	<i>vesca</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees, medicinal plant	Occurrence not endangered
52	<i>Fragaria</i>	<i>viridis</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees,	Occurrence not endangered
53	<i>Galanthus</i>	<i>nivalis</i>	Ornamental plants	endangered
54	<i>Galega</i>	<i>officinalis</i>	medicinal plant, fodder plants.	Occurrence not endangered
55	<i>Gentiana</i>	<i>asclepiadea</i>	fodder plants, lawn grasses	endangered
56	<i>Gentiana</i>	<i>lutea</i>	medicinal plant, donor plant of nectar or pollen	endangered
57	<i>Glaucium</i>	<i>flavum</i>	medicinal plant, donor plant of nectar or pollen	Occurrence not endangered
58	<i>Gypsophila</i>	<i>paniculata</i>	Ornamental plants and lawn grasses	Occurrence not endangered
59	<i>Hepatica</i>	<i>transsilvanica</i>	medicinal plant, lawn grasses	Occurrence not endangered
60	<i>Heracleum</i>	<i>sphondylium</i>	wild vegetables, fodder plants.	Species with unknown degree of endangering
61	<i>Herniaria</i>	<i>glabra</i>	medicinal plant	Species with unknown degree of endangering
62	<i>Holcus</i>	<i>lanatus</i>	fodder plants.	Occurrence not endangered
63	<i>Humulus</i>	<i>lupulus</i>	medicinal plant, wild vegetables, ornamental plants and lawn grasses	Occurrence not endangered
64	<i>Hyoscyamus</i>	<i>riger</i>	medicinal plant	endangered
65	<i>Hypericum</i>	<i>perforatum</i>	medicinal plant	Occurrence not endangered
66	<i>Iris</i>	<i>florentina</i>	Ornamental plants	highly endangered
67	<i>Iris</i>	<i>germanica</i>	Ornamental plants	highly endangered
68	<i>Isatis</i>	<i>tinctoria</i>	Technical crop, plant with oil or fat content, fodder plant	Species with unknown degree of endangering
70	<i>Juglans</i>	<i>regia</i>	plant with oil or fat content, fruits, wild fruits incl. nuts, rootstocks for fruit trees,	Occurrence not endangered

			medicinal usage	
71	<i>Lathyrus</i>	<i>pratensis</i>	fodder plant	Occurrence not endangered
72	<i>Lathyrus</i>	<i>sylvestris</i>	fodder plant, plant for protection against soil erosion or soil improvement	Occurrence not endangered
73	<i>Leonurus</i>	<i>cardiaca</i>	medicinal plant	endangered
74	<i>Ligustrum</i>	<i>vulgare</i>	plant for protection against soil erosion or soil improvement	Occurrence not endangered
75	<i>Linum</i>	<i>catharticum</i>	medicinal plant	Occurrence not endangered
76	<i>Lolium</i>	<i>multiflorum</i>	fodder plant	Occurrence not endangered
77	<i>Lolium</i>	<i>perenne</i>	fodder plant	Occurrence not endangered
78	<i>Lotus</i>	<i>corniculatus</i>	fodder plant	Occurrence not endangered
79	<i>Lotus</i>	<i>tenuis</i>	fodder plant	Occurrence not endangered
80	<i>Lupinus</i>	<i>angustifolius</i>	plant with high protein content , fodder plant	Occurrence not endangered
81	<i>Lycnis</i>	<i>coronaria</i>	Ornamental plants and lawn grasses	Species with unknown degree of endangering
82	<i>Malus</i>	<i>silvestris</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees, Woody plant for garden.	Species with unknown degree of endangering
83	<i>Malva</i>	<i>glabra</i>	medicinal plant	Occurrence not endangered
84	<i>Malva</i>	<i>sylvestris</i>	medicinal plant	Occurrence not endangered
85	<i>Marrubium</i>	<i>vulgare</i>	medicinal plant	Occurrence not endangered
86	<i>Matricaria</i>	<i>chamomilla</i>	medicinal plant	Occurrence not endangered
87	<i>Medicago</i>	<i>falcata</i>	fodder plant, plant for protection against soil erosion or soil improvement	Occurrence not endangered
88	<i>Medicago</i>	<i>lupulina</i>	fodder plant, plant for protection against soil erosion or soil improvement	Occurrence not endangered
89	<i>Medicago</i>	<i>sativa</i>	fodder plant, plant for protection against soil erosion or soil improvement	Occurrence not endangered
90	<i>Melilotus</i>	<i>albus</i>	fodder plant, plant for protection against soil erosion or soil improv.	Occurrence not endangered
91	<i>Melilotus</i>	<i>officinalis</i>	medicinal and fodder plant, plant for protection against soil erosion or soil improvement	Occurrence not endangered
92	<i>Mentha</i>	<i>piperita</i>	medicinal plant	Occurrence not endangered
93	<i>Mentha</i>	<i>spicata</i>	medicinal plant	Species with unknown degree of endangering
94	<i>Myosotis</i>	<i>sylvatica</i>	Ornamental plant and lawn grasses	Occurrence not endangered
95	<i>Narcissus</i>	<i>pseudonarcissus</i>	Ornamental plant and lawn grasses	Species with unknown degree of endangering
96	<i>Nigella</i>	<i>damascena</i>	medicinal plant, ornamental plant and lawn grasses	Species with unknown degree of endangering
97	<i>Onobrychis</i>	<i>vicifolia</i>	medicinal plant, ornamental plant and lawn grasses	Species with unknown degree of endangering
98	<i>Origanum</i>	<i>vulgare</i>	spice plant	rare
99	<i>Papaver</i>	<i>bracteatum</i>	medicinal plant, ornamental plant and lawn grasses	rare
100	<i>Papaver</i>	<i>orientale</i>	medicinal plant, ornamental plant and lawn grasses	rare
101	<i>Phalum</i>	<i>pratense</i>	fodder plant	Occurrence not endangered
102	<i>Phleum</i>	<i>phleoidis</i>	fodder plant	Occurrence not endangered
103	<i>Phacelia</i>	<i>tanacetifolia</i>	medicinal plant	endangered
104	<i>Plantago</i>	<i>major</i>	medicinal plant	Occurrence not endangered
105	<i>Plantago</i>	<i>lanceolata</i>	medicinal plant	Occurrence not endangered
106	<i>Poa</i>	<i>alpina</i>	fodder plant	rare
107	<i>Poa</i>	<i>angustifolia</i>	fodder plant and lawn grasses	Occurrence not endangered
108	<i>Poa</i>	<i>annua</i>	lawn grasses	Occurrence not endangered
109	<i>Poa</i>	<i>bulbosa</i>	fodder plant	Species with unknown degree of endangering
110	<i>Poa</i>	<i>nemoralis</i>	fodder plant and lawn grasses	Occurrence not endangered



111			fodder plant	Occurrence not endangered
	<i>Poa</i>	<i>pratensis</i>		
112	<i>Polygonum</i>	<i>aviculare</i>	medicinal plant, wild vegetables	Species with unknown degree of endangering
113	<i>Potentilla</i>	<i>aurea</i>	ornamental plant and lawn grasses	endangered
114	<i>Primula</i>	<i>vulgaris</i>	wild vegetables, ornamental plant	
115			fruits, wild fruits incl. nuts, rootstocks for fruit trees, plant for protection against soil erosion or soil improvement, medicinal plant	
	<i>Prunus</i>	<i>spinosa</i>		
116	<i>Pulmonaria</i>	<i>officinalis</i>	medicinal plant	Occurrence not endangered
117	<i>Ranunculus</i>	<i>acer</i>	medicinal plant	Occurrence not endangered
118	<i>Ranunculus</i>	<i>arvensis</i>	medicinal plant	Occurrence not endangered
119	<i>Raphanus</i>	<i>raphanistrum</i>	plant with high oil content, wild vegetables, fodder plant	Occurrence not endangered
120	<i>Rheum</i>	<i>officinale</i>	medicinal plant	Occurrence not endangered
121	<i>Rheum</i>	<i>palmatum</i>	medicinal plant	Occurrence not endangered
122			fruits, wild fruits incl. nuts, rootstocks for fruit trees, fruits, wild fruits incl. nuts, rootstocks for fruit trees, Woody plant for garden	
	<i>Rosa</i>	<i>multiflora</i>		
123	<i>Rosa</i>	<i>pendulina</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees, Woody plant for garden	endangered
124	<i>Rosa</i>	<i>canina</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees, Woody plant for garden	Occurrence not endangered
125	<i>Rosmarinus</i>	<i>officinalis</i>	medicinal and aromatic plant	Occurrence not endangered
126	<i>Rubia</i>	<i>tinctorum</i>	medicinal and aromatic plant	
127	<i>Rumex</i>	<i>acetosa</i>	medicinal plant, fodder plant	Occurrence not endangered
128	<i>Rumex</i>	<i>patientia</i>	medicinal plant, fodder plant	Occurrence not endangered
129	<i>Ruta</i>	<i>graveolens</i>	medicinal plant, ornamental plant and lawn grasses	endangered
130	<i>Sanguisorba</i>	<i>minor</i>	wild vegetables, fodder plant, medicinal plant	
131	<i>Saponaria</i>	<i>officinalis</i>	medicinal plant, ornamental plant and lawn grasses, technical crop	potentially endangered
132			medicinal plant, woody plant for garden, plant for protection against soil erosion or soil improvement	
	<i>Sarothamnus</i>	<i>scoparius</i>		
133	<i>Scorzonera</i>	<i>laciniata</i>	wild vegetables, medicinal plant, technical crop	highly endangered
134	<i>Scrophularia</i>	<i>nodosa</i>	medicinal plant	Occurrence not endangered
135	<i>Scutellaria</i>	<i>alpina</i>	ornamental plant and lawn grasses	rare
136	<i>Senecio</i>	<i>rupestris</i>	ornamental plant and lawn grasses	endangered
137	<i>Senecio</i>	<i>vulgaris</i>	ornamental plant and lawn grasses	endangered
138	<i>Setaria</i>	<i>verticillata</i>	Plants with high starch or sugar content	Occurrence not endangered
139	<i>Silene</i>	<i>pendula</i>	ornamental plant and lawn grasses	endangered
140	<i>Sinapis</i>	<i>arvensis</i>	medicinal and aromatic plant	Occurrence not endangered
141	<i>Solanum</i>	<i>dulcamara</i>	medicinal plants, ornamental plant and lawn grasses	Occurrence not endangered
142	<i>Solidago</i>	<i>virgaurea</i>	medicinal plants	Occurrence not endangered
143	<i>Spiraea</i>	<i>tomentosa</i>	Woody plant for garden, for protection against wind and for ornamental purposes	
144	<i>Symphytum</i>	<i>officinale</i>	fodder plant, wild vegetables, medicinal plant	
145	<i>Tanacetum</i>	<i>vulgare</i>	medicinal plant, ornamental plant	Occurrence not endangered
146	<i>Taraxacum</i>	<i>officinale</i>	wild vegetables, medicinal plants, fodder plant	Occurrence not endangered
147	<i>Thymus</i>	<i>serpyllum</i>	medicinal and aromatic plant, wild vegetables	endangered
148	<i>Thymus</i>	<i>montanus</i>	medicinal plant, wild vegetables	rare

149	<i>Tragopogon</i>	<i>pratensis</i>	medicinal plant	Occurrence not endangered
150	<i>Trifolium</i>	<i>repens</i>	fodder plant, medicinal plant	Occurrence not endangered
151	<i>Trifolium</i>	<i>alpestre</i>	fodder plant	Occurrence not endangered
152	<i>Trifolium</i>	<i>aureum</i>	fodder plant	Occurrence not endangered
153	<i>Trifolium</i>	<i>campestre</i>	fodder plant	Occurrence not endangered
154	<i>Trifolium</i>	<i>fragiferum</i>	fodder plant	Occurrence not endangered
155	<i>Trifolium</i>	<i>medium</i>	fodder plant	Occurrence not endangered
156	<i>Trifolium</i>	<i>montanum</i>	fodder plant	Occurrence not endangered
157	<i>Trifolium</i>	<i>ochroleucon</i>	fodder plant	Occurrence not endangered
158	<i>Trifolium</i>	<i>pannonicum</i>	fodder plant	Occurrence not endangered
159	<i>Trigonella</i>	<i>caerulea</i>	medicinal plant	
160	<i>Urtica</i>	<i>dioica</i>	medicinal plant, wild vegetables, technical crop	Occurrence not endangered
161	<i>Vaccinium</i>	<i>myrtillus</i>	fruits, wild fruits incl. nuts, rootstocks for fruit trees, medicinal plant	Occurrence not endangered
162	<i>Verbascum</i>	<i>phlomoides</i>	medicinal plants, ornamental plant	Occurrence not endangered
163	<i>Verbascum</i>	<i>blattaria</i>	medicinal plants, ornamental plant	Occurrence not endangered
164	<i>Verbena</i>	<i>officinalis</i>	medicinal plant, wild vegetables	endangered
165	<i>Vicia</i>	<i>cracca</i>	fodder plant	Occurrence not endangered
166	<i>Vicia</i>	<i>hirsuta</i>	fodder plant	Occurrence not endangered
167	<i>Vicia</i>	<i>tetrasperma</i>	fodder plant	Occurrence not endangered
168	<i>Vicia</i>	<i>villosa</i>	fodder plant	Occurrence not endangered
169	<i>Vicia</i>	<i>sapium</i>	fodder plant	Occurrence not endangered
170	<i>Vinca</i>	<i>major</i>	medicinal plant, ornamental plant	Occurrence not endangered
171	<i>Vinca</i>	<i>minor</i>	medicinal plant, ornamental plant	Occurrence not endangered
172	<i>Viola</i>	<i>odorata</i>	medicinal plant, ornamental plant	Occurrence not endangered
173	<i>Viola</i>	<i>tricolor</i>	medicinal plant, ornamental plant	Occurrence not endangered
174	<i>Vitis</i>	<i>vinifera</i>	fruits, wild fruits, incl. rootstocks for fruit trees,	Occurrence not endangered
175	<i>Xanthium</i>	<i>strumarium</i>	plant with high oil content	not endangered



DISTRIBUTION OF PROTECTED AREAS IN ROMANIA



THE LIST OF ENDEMIC PLANT SPECIES FROM ROMANIA

Species	Geographic area	Frequency	Habitat
<i>Andryala (Pietrosia) levitomentosa</i>	the Eastern Carp ¹ (Bistrita Mountains ²)	v rare ⁵	r-r ⁸
<i>Anthemis carpatica ssp. pyrethriiformis</i>	the Eastern Carp	spor ⁶	mead ⁹
<i>Aquilegia nigricans ssp. subcarposa</i>	Rom ³ Carp	spor	mead
<i>Astragalus excapus ssp. transsilvanicus</i>	Cluj, Alba cs	rare	mead
<i>Astragalus peterfi</i>	Cluj c ⁴	rare	mead
<i>Astragalus pseudopurpureus</i>	Bacau, Bicaz cs	rare	r-r
<i>Astragalus roemerii</i>	the Rom Carp	rare	r-r
<i>Athamata turbith ssp. hungarica</i>	the Southern Carp	rare	r-r
<i>Barbarea lepusnica</i>	the Southern Carp (Retezat, Godeanu Ms)	rare	w ¹⁰
<i>Campanula romanica</i>	Romania (Dobrogea)	spor	r-r
<i>Carduus kernerii ssp. lobulatifolius</i>	Godeanu Mts	spor	mead
<i>Centaurea jankae</i>	Tulcea c	v.rare	mead
<i>Centaurea phrygia ssp. rarauensis</i>	Rarau, Harghita Mts	rare	mead
<i>Centaurea phrygia retezatensis</i>	Retezat Mts	rare	mead
<i>Centaurea pinnatifida</i>	the Rom Carp	spor	mead
<i>Centaurea pontica</i>	Romania (seaside)	rare	s-r ¹¹
<i>Centaurea trichocephala ssp. simonkaiana</i>	Romania (Transsylvania, Banat)	spor	mead, gl ¹²
<i>Cephalaria radiata</i>	Romania (Transsylvania, Banat)	rare	mead, bs ¹³



<i>Cerastium transsylvanicum</i>	the Southern, Eastern Carp	spor	mead
<i>Delphinium simonkainum</i>	the Western, Eastern Carp (Gilau, Trascau, Harghita Mts)	spor	r-r
<i>Dianthus callizonus</i>	Piatra Craiului Mts	rare	mead, r-r
<i>Dianthus glacialis ssp. gelidus</i>	the Southern, Eastern Carp	spor	mead
<i>Dianthus henteri</i>	the Southern Carp	spor	mead
<i>Dianthus spiculifolius (D. petraeus ssp. spiculifolius)</i>	the Rom Carp	freq ⁷	mead, r-r
<i>Dianthus tenuifolius (D. carthusianorum ssp. tenuifolius)</i>	the Rom Carp	freq	mead, r-r
<i>Draba dormeri</i>	Retezat Mts	rare	r-r
<i>Draba haynaldii</i>	the Southern, Eastern Carp	spor	r-r
<i>Draba simonkaina</i>	Parang, Retezat Mts	rare	r-r
<i>Festuca bucegiensis (glacialis)</i>	the Southern Carp (Bucegi, Fagaras, Parang Mts)	spor	mead, bs
<i>Festuca nitida ssp. flaccida</i>	the Southern, Eastern Carp	spor	mead
<i>Festuca pachyphylla</i>	the Southern, Eastern Carp	spor	mead, r-r
<i>Festuca versicolor ssp. dominii</i>	Rodna Mts	freq	mead, r-r
<i>Fumaria jankae</i>	Bihor c	v.rare	mead
<i>Galium babilonii</i>	the Southern Carp (Mehedinti, Gorj, Valcea, Sibiu cs)	rare	for ¹⁴ , r-r
<i>Helictichon decorum</i>	Rom Carp	spor	r-r
<i>Hepatica transsylvanica</i>	the Southern, Eastern Carp	spor	for, bs
<i>Hesperis matronalis ssp. moniliformis</i>	the Southern, Eastern Carp	spor	bs, gl, mead
<i>Hesperis oblongiflora</i>	the Southern, Eastern Carp (Barsa Mts)	spor	mead
<i>Hieracium praebiharicum</i>	Alba c	rare	mead
<i>Linum uninerve</i>	Harghita, Caras-Severin, Mehedinti, Gorj cs	spor	r-r

<i>Lychinis nivalis</i> (<i>Polyschemone Silene nivalis</i>)	the Rodnei Mts	rare	mead
<i>Minuartia cataractarum</i> (<i>M.hirsuta</i> ssp. <i>cataractarum</i>)	Portile de Fier	rare	r-r
<i>Onobrychis montana</i> ssp. <i>transsylvanica</i> (<i>O. transsylvanica</i>)	the Southern, Eastern Carp	spor	r-r
<i>Oritogallum ortophyllum</i> ssp. <i>acuniatum</i>	Brasov c - Tampa	rare	gl
<i>Oritogallum ortophyllum</i> ssp. <i>samophyllum</i>	Ialomita c - Sacuieni	rare	s-r
<i>Papaver corona-sancii-stephani</i> (<i>P. pyrenaicum</i>)	the Southern, Eastern Carp	rare	r-r
<i>Poa granitica</i> ssp. <i>disparilis</i>	the Southern, Eastern Carp	spor	mead
<i>Primula auricula</i> ssp. <i>serratifolia</i>	Southern Carp (Valcan, Godeanu, Cernei Mts)	rare	mead, r-r
<i>Primula wulfeniana</i> ssp. <i>baumgarteniana</i>	Southern Carp (Postavaru, Piatra Craiului Mts)	rare	mead
<i>Salvia transsylvanica</i>	Maramures, Alba, Harghita, Hunedoara, Arges, Buzau cs	spor	mead
<i>Saxifraga mutata</i> ssp. <i>demissa</i> (<i>S. demissa</i>)	Southern Carp (Barsa Mts)	spor	r-r
<i>Silene dinarica</i>	Southern Carp (Fagaras, Cozia, Godeanu, Bucegi, Cluj)	rare	mead
<i>Sorbus bordasii</i>	Mehedinti, Cernei Mts	rare	r-r
<i>Thesius kernerianum</i>	Ciucas, Bucegi, Piatra Craiului Mts	spor	mead, r-r
<i>Thelapsi dacicum</i> ssp. <i>banaticum</i>	the Southern Carp (Parang, Mehedinti, Tarcu, Godeanu Mts)	spor	mead, bs
<i>Thymus biharensis</i> (<i>marginatus</i>)	Rom Carp	spor	mead
<i>Viola jooi</i>	Transylvania, Banat, Olt, Muntenia, Moldavia	spor	r-r

Legend:

1-Carpathians	5-very rare	9-rocky-region	13-bushes
2-Mountain	6-sporadic	10-wetlands	14-forest
3-Romanian	7-frequent	11-sandy-region	
4-county	8-meadow	12-glades	



STRICT PROTECTED PLANTS

Taxon	Family
<i>Marsilea quadrifolia</i> L	Marsileaceae
<i>Botrychium matricariifolium</i> A. Braun ex Koch, <i>Botrychium multifidum</i> (S.G. Gmelin) Rupr.	Ophioglossaceae
<i>Salvinia natans</i> (L.) All	Salviniaceae
<i>Caldesia parnassifolia</i> (L.) Parl.	Alismataceae
<i>Narcissus angustifolius</i> Curt	Amaryllidaceae
<i>Campanula abietina</i> Griseb. Et Schenk., <i>Campanula romanica</i> Savul	Campanulaceae
<i>Dianthus serotinus</i> Waldst. et Kit., <i>Moehringia jankae</i> Griseb. ex Janka	Caryophyllaceae
<i>Andryala levitomentosa</i> (E. I. Nayar) Brandza, <i>Centaurea pontica</i> Prodán & E. I. Nayar, <i>Ligularia sibirica</i> (L.) Cass.	Compositae
<i>Alyssum borzaeanum</i> E. I. Nayar, <i>Armoracia macrocarpa</i> (Waldst. & Kit.), <i>Draba dorneri</i> Heuffel, <i>Schivereckia podolica</i> (Besser) Andr., <i>Thlaspi jankae</i> A. Kern	Cruciferae
<i>Eleocharis carniolica</i> Koch	Cyperaceae
<i>Aldrovanda vesiculosa</i> L	Droseraceae
<i>Stipa danubialis</i> Dihoru & Roman	Gramineae
<i>Dracocephalum austriacum</i> L.	Labiatae
<i>Astragalus peterii</i> Jav., <i>Astragalus psedopurpureus</i> Gusul.	Leguminosae
<i>Colchicum arenarium</i> Waldst. & Kit., <i>Colchicum fominii</i> Bordz., <i>Fritillaria montana</i> Hoppe., <i>Lilium jankae</i> A. Kerner,	

<i>Tulipa hungarica</i> Borbas	Liliaceae
<i>Syringa josikaea</i> Jacq. fil	Oleaceae
<i>Cypripedium calceolus</i> L., <i>Liparis loeselii</i> (L.) Rich.	Orchidaceae
<i>Paeonia officinalis</i> L. subsp. <i>banatica</i> (Rochel) Soo, <i>Paeonia tenuifolia</i> L.	Paeoniaceae
<i>Zostera marina</i> (Med.)	Potamogetonaceae
<i>Primula wulfeniana</i> Scot subsp. <i>Baumgarteniana</i> (Degen & Moesz) Ludi	Primulaceae
<i>Pulsatilla grandis</i> Wend. ^{s.s.} (<i>Pulsatilla halleri</i> (All.), Willd. subsp. <i>grandis</i> (Wend.) Meikle), <i>Pulsatilla patens</i> (L.) Miller	Ranunculaceae
<i>Potentilla emilii-popii</i> E. I. Nayardy	Rosaceae
<i>Galium moldavicum</i> (Dobrescu) Franco	Rubiaceae
<i>Thesium ebraceatum</i> Hayne	Santalaceae
<i>Saxifraga hirculus</i> L.	Saxifragaceae
<i>Lindernia procumbens</i> (Krocker) Philcox., <i>Verbascum purpureum</i> (Janka) Huber-Morath	Scrophulariaceae
<i>Trapa natans</i> L	Trapaceae
<i>Typha minima</i> Funk, <i>Typha shuttleworthii</i> Koch & Sonder	Typhaceae
<i>Angelica palustris</i> (Besser) Hoffman, <i>Ferula sadleriana</i> Ladebour	Umbelliferae



TERTIARY AND GLACIAL RELICTS

A. Tertiary relicts

Taxons	Distribution area
<i>Nymphaea lotus var. thermalis</i>	Baile "1 Mai", Oradea – Judetul Bihor
<i>Syringa josikaea</i>	Valea Iadului, Valea Draganului, Valea Somesului cald, Valea Ariesului – Carpatii NE ; Valea Galbena – Muntii Bihor, Muntii Gilau, Ciucea, Negreni (Judetul Cluj; Valea Obarsiei, Obarsia (Judetul Hunedoara)
<i>Hepatica Transsilvatica</i>	Carpatii de E și S

B. Glaciary relicts

Eutrophic swamp	Taxons	Distribution area
	<i>Dryopteris cristata</i>	Borosneu – Zagon (jud. Covasna)
	<i>Betula humilis</i>	Tusnadu Nou (jud. Harghita)
	<i>Salix starkeana</i>	Bilbor (jud. Harghita)
	<i>Spirea salicifolia</i>	Comandau (jud. Covasna).
	<i>Stellaria longifolia</i>	Sandru Mare – Nemira (jud. Covasna)
	<i>Viola epipsila</i>	Bazinul Ciuc
	<i>Pedicularis sceptrum carolinum</i>	Harman (jud. Brasov)
	<i>Cnidium dubium</i>	Reci (jud. Covasna)
	<i>Achillea impatiens</i>	Bazinul Giurgeu (jud. Harghita)
	<i>Carex loliacea</i>	Dragoiasa (jud. Suceava)
	<i>Carex dioica</i>	Ozunca - Bicsad (Covasna)
	<i>Cochlearia pyrenaica</i>	Maramures și Bucovina

<i>Sesleria coerulea</i> , <i>Calla elongata</i> , <i>Carex appropinquata</i> , <i>Carex diandra</i> , <i>Drosera anglica</i> , <i>Ribes nigrum</i> , <i>Rubus</i> <i>suberectus</i> , <i>Angelica palustris</i> , <i>Lysimachia thyrsoflora</i> , <i>Viola palustris</i> , <i>Swertia perennis</i> , <i>Ligularia sibirica</i>	
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Taxons	Distribution area
Oligotroph swamp	
<i>Lycopodium inundatum</i>	M-tii Oas-Gutai, M-tii Gilaului, M-tii Muntele Mare, M-tii Bodocului (Tusnad), Ceahlau, Boteni (jud. Arges)
<i>Scheuchzeria palustris</i>	Lacul Manta, Cislau (jud, Buzau)
<i>Carex limosa</i> , <i>Carex paupercula</i> , <i>Carex pauciflora</i>	M-tii Semenicului
<i>Rhynchospora alba</i> , <i>Betula nana</i>	Tinovul Luci de la Sanraieni (jud. Hargita)
<i>Empetrum nigrum</i> , <i>Salix myrtilloides</i>	Tinovul Laptici – Valea Ialomitei (jud. BV)
<i>Drosera rotundifolia</i> , <i>Drosera obovata</i> , <i>Drosera intermedia</i> , <i>Andromeda polifolia</i> , <i>Vaccinium oxycoccos</i>	Oasa – M-tii Sebesului, Lacu Rosu – Muntele Penteleu
<i>Trientalis europaea</i>	Sandru Mare - M-tii Nemira, Maramures, Ciumarna – Moldovita (jud. Suceava)



EVALUATION OF GERMPLASM FUND IN THE FRUIT TREES AND SMALL FRUITS COLLECTIONS

No crt	Species	No. of accessions	Evaluated	Species	Foreign cultivars	Indigenous cultivars
1	Apple	872	308	7	220	77
2	Pear	536	454	30	311	138
3	Quince	73	42	-	10	105
4	Plum	812	317	-	174	152
5	Sweet cherry	461	317	-	200	154
6	Sour cherry	160	154	1	76	50
7	Apricot	663	394	3	306	85
8	Peach	1075	246	-	169	77
9	Walnut	222	222	2	25	131
10	Hazelnut	47	47	3	35	4
11	Almond	128	128	1	71	48
12	Chestnut	42	22	-	-	13
13	Currant	195	183	-	183	12
14	Gooseberry	26	21	-	23	3
15	Raspberry	109	58	-	104	5
16	Blackberry	33	31	-	31	2
17	Blueberry	50	42	-	43	7
18	Tamarisk	10	10	-	-	10
19	Rosehip	5	5	-	-	5
20	Lawn	29	29	-	-	29
21	Elderberry	3	3	-	-	3
22	Chokeberry	5	5	-	-	5
23	Strawberry	149	90	-	144	5
x	Total	5705	3128	47	2125	1143

AGRICULTURAL RESEARCH INSTITUTES AND SUBORDINATED STATIONS INVOLVED IN THE ROMANIAN PLANT BREEDING PROGRAMS



No.	The name of institutions	The plant species	Place
1.	Agricultural Research and Development Institute of Fundulea	common wheat, durum wheat, rye, triticale, barley, winter and spring two rowed barley, rice, maize and sorghum, legumes for grains (soybeans, bean, pea) Industrial crops (sunflower, linseed, flax), forage crops (annual and perennial leguminous and grasses).	Fundulea
2.	Agricultural Research and Development Station of Suceava	Common wheat, two-rowed barley, triticale, maize, potato	Suceava
3.	Agricultural Research and Development Station of Lovrin	Maize, wheat, oat, turnip, beet	Lovrin
4.	Agricultural Research and Development Station of Teleorman	Castor oil, cotton, chick pea	Teleorman
5.	Agricultural Research and Development Station of Livada	Flax, lupine, red clover	Livada
6.	Agricultural Research and Development Station of Secuieni	hemp	Secuieni
7.	Agricultural Research and Development Station of Valu lui Traian	Bean, soybean	Valu lui Traian
8.	Agricultural Research and Development Station of Pitesti	wheat	Pitesti
9.	Agricultural Research and Development Station of Simnic	wheat	Simnic
10.	Agricultural Research and Development Station of Oradea	wheat	Oradea
11.	Agricultural Research and Development Station of Marculesti	cereals, technical plants, potatoes and pastures	Marculesti
12.	Agricultural Research and	common wheat, spring	Turda

	Development Station of Turda	wheat, spring two rowed barley, triticale, oat, maize, popcorn, soybean, bean	
13.	Agricultural Research and Development Station of Braila	rice	Braila
14.	Research and Development Station for Growing Sand Plants of Dabuleni	hazelnut	Dabuleni
15.	National Institute of Research and Development for Potato and Sugar Beet of Brasov	potato, sugar beet	Brasov
16.	Potato Research and Development Station of Tg, Secuiesc	potato	Tg, Secuiesc
17.	Potato Research and Development Station of Miercurea Ciuc	potato	Miercurea Ciuc
18.	Agricultural Research and Development Station of Tulcea	potato	Tulcea
19	Research and Development Institute for Grassland of Brasov	Perennial gramineas (orchard grass, fescue, fingers and thumbs, white clover)	Brasov
20	Grassland Research and Development Station of Vaslui	orchard grass, fescue, grass, white clover	Vaslui
21	Grassland Research and Development Station Timisoara	Fescue	Timisoara
22	Grassland Research and Development Station Jucu	Awnless brome grass	Jucu
23	Research and Development Institute for Flower and Vegetables of Vidra	Flowers, tomatoes, radish, salad, spinach, cabbage, celery, eatable mushrooms	Vidra
24	Vegetable Research and Development Station of Bacau	Cabbage , endive, onion, bean, kohlrabi, carot	Bacau
25	Vegetable Research and Development Station of Buzau	Pepper, cucumber, pumpkin, cabbage, spinach	Buzau
26	Vegetable Research and Development Station of Isalnita	Pepper, cucumber, bean, peas, radish, tomatoes, cabbage	Isalnita
27	Maracineni Fruit Tree Growing Research and Development Institute	Cherry, apple, almond-tree, walnut, plum, strawberries and fruit shrubs.	Maracineni
28	Research and Development	Peache and nectarine,	Baneasa

	Station for Fruit Tree Growing Baneasa	apricot	
29	Research and Development Station for Fruit Tree Growing Bistrita	Apple, cherry, plum	Bistrita
30	Research and Development Station for Fruit Tree Growing Cluj Napoca	Cherry, apple, pear, sour cherry, fruit shrubs	Cluj Napoca
31	Research and Development Station for Fruit Tree Growing Vilcea	Plum, hazel-tree	Vilcea
32	Research and Development Station for Fruit Tree Growing Tg. Jiu	Apple, pear.	Tg. Jiu
33	Research and Development Station for Fruit Tree Growing Falticeni	Apple, cherry, sour chery, nut tree, fruit shrubs.	Falticeni
34	Research and Development Institute for Wine Making and Wine Growing of Valea Calugareasca	Species of vine for wine and table grapes	Valea Calugareasca
35	Research and Development Station for Wine Making and Wine Growing Murfatlar	Species of vine for wine and table grapes	Murfatlar
36	Research and Development Station for Wine Making and Wine Growing Odobesti	idem	Odobesti
37	Research and Development Station for Wine Making and Wine Growing Blaj	Species of vine for wine and table grapes	Blaj
38	Research and Development Station for Wine Making and Wine Growing Minis	idem	Minis
39	Research and Development Station for Wine Making and Wine Growing Bujoru	idem	Bujoru
40	Research and Development Station for Medicinal and Aromatic Plants Fundulea	Fennel, mint, chamomile, sweet basil etc	Fundulea
41	Tabacco Galaxy Society S.A Bucuresti (Research and Agricultural Production Department of Tobacco) Bucuresti	tobacco	Bucuresti
42	Scipomar Society S.A Baia Mare	eatable chest	Baia Mare



THE PRESENT SITUATION OF DIFFERENT ROMANIAN PLANT VARIETIES CREATED BY BREEDERS DURING PERIOD 2003-2007, FROM THE TOTAL CULTIVARS REGISTERED IN NATIONAL CATALOGUE

Species/ year	2003		2004		2005		2006		2007	
	Total registered	Roma-nian cultivars	Total registered	Roma-nian cultivars	Total registered	Roma-nian cultivars	Total registered	Roma-nian cultivars	Total registered	Roma-nian cultivars
Cereals										
Wheat	6	3	5	4	7	3	5	0	1	0
Durum wheat	0	0	0	0	2	1	0	0	1	0
Sudan-grass	1	1	1	0	0	0	0	0	0	0
Millet	1	1	1	1	0	0	0	0	0	0
Rice	1	1	0	0	1	1	0	0	0	0
Barley	5	4	3	3	5	0	8	0	1	0
Oat	0	0	4	0	2	2	0	0	0	0
Maize	30	2	34	2	34	1	19	1	12	0
Sorghum	0	0	4	1	2	0	0	0	0	0
Sorghum X Sudan- grass	1	1	0	0	0	0	0	0	0	0
Triticale	1	1	0	0	1	1	1	1	0	0
Total	46	14	52	11	54	9	33	1	15	0
Oil and fiber plants										
Sunflower	12	2	13	0	14	4	10	3	5	0
Flax	2	2	0	0	0	0	0	0	0	0
Rape	5	0	5	0	0	0	9	3	6	0
Castor oil	0	0	3	3	0	0	0	0	0	0
Soybean	4	0	6	0	1	1	1	1	0	0
Total	23	4	27	3	15	5	20	7	11	0
Tuber and root plants										
Potato	11	9	6	3	0	0	1	1	0	0
Sugar beet	5	0	3	0	6	0	5	1	5	1
Total	16	9	9	3	6	0	6	2	5	1
Fodder plants										
Horse bean	0	0	1	1	0	0	0	0	0	0
Foxtail millet	1	1	0	0	0	0	0	0	0	0
June grass	0	0	1	1	0	0	0	0	0	0
Big trefoil	0	0	2	2	0	0	0	0	1	1
Orchard grass	1	0	1	1	1	1	0	0	0	0
Ribbon grass	0	0	1	1	0	0	0	0	0	0
Lucerne	1	1	1	1	0	0	2	2	0	0
Field pea	1	0	0	0	4	1	0	0	0	0
Stone loach	1	1	0	0	0	0	0	0	0	0
Awnless brome grass	0	0	1	1	0	0	0	0	0	0
Tall fescue	0	0	1	1	1	0	0	0	0	0
Fescue	0	0	0	0	1	0	0	0	0	0
Red fescue	3	0	0	0	1	1	0	0	0	0
Crested wheat grass	0	0	0	0	0	0	1	1	0	0
Hybrid ryegrass	0	0	1	1	0	0	0	0	0	0
Perennial ryegrass	1	1	0	0	2	2	0	0	0	0
Cocks head	0	0	0	0	0	0	1	1	0	0

White clover	0	0	1	1	0	0	0	0	0	0
Alexandrian clover	0	0	0	0	1	1	0	0	0	0
Foxtail clover	0	0	1	1	0	0	0	0	0	0
Turnip-rooted cabbage	0	0	1	1	0	0	0	0	0	0
Tobacco	1	1	1	1	0	0	0	0	0	0
Total	10	5	14	14	11	6	4	4	1	1
Vegetables										
Endive	1	1	0	0	0	0	0	0	0	0
Pepper	4	2	12	10	5	3	4	4	3	3
Gumbo	0	0	0	0	1	1	1	1	0	0
Sweet potato	0	0	0	0	0	0	0	0	0	0
Broccoli	0	0	0	0	0	0	0	0	0	0
Sweet basil	0	0	0	0	1	1	0	0	0	0
Cucumber	3	0	3	2	2	2	3	3	1	1
Onion	2	1	4	2	5	4	1	1	0	0
Chicory	0	0	0	0	0	0	0	0	0	0
Savory	0	0	0	0	1	1	0	0	0	0
Cauliflower	0	0	0	0	0	0	0	0	0	0
Field pumpkin	0	0	1	1	0	0	1	1	0	0
Pie pumpkin	0	0	1	1	0	0	0	0	0	0
Marrow pumpkin	1	1	0	0	2	2	0	0	1	1
Kidney bean	1	1	0	0	2	2	0	0	1	1
Bush bean	1	0	5	2	5	5	2	2	1	1
Pole bean	0	0	1	1	2	2	0	0	0	0
Cawpea	0	0	0	0	0	0	0	0	0	0
Turnip	0	0	0	0	3	3	0	0	0	0
Lovage	0	0	1	1	1	1	0	0	1	1
Orache	3	3	0	0	0	0	0	0	0	0
Mangold	0	0	3	3	0	0	0	0	0	0
Garden pea	5	2	3	1	8	8	1	1	1	1
Dill	3	2	1	1	6	6	0	0	1	1
Carrot	3	2	0	0	5	5	0	0	0	0
Chick pea	0	0	2	2	0	0	0	0	0	0
Eggplant	2	1	4	4	0	0	2	2	0	0
Parsnip	0	0	1	1	0	0	1	1	0	0
Leaf parsley	0	0	1	1	1	1	0	0	0	0
Root parsley	1	0	1	1	0	0	0	0	1	1
Yellow melon	0	0	2	1	3	3	1	1	1	0
Citron melon	2	0	0	0	6	5	0	0	4	3
Sweet maize	1	1	3	3	1	1	1	1	0	0
Leek	0	0	1	1	0	0	0	0	0	0
Garden radish	1	0	1	1	2	2	0	0	0	0
Lettuce	1	0	1	1	5	5	0	0	0	0
Radish	0	0	1	1	2	2	1	1	0	0
Red beet	0	0	1	0	3	3	1	1	0	0
Spinach	0	0	0	0	4	4	0	0	0	0
Tomatoes	4	1	12	10	6	5	3	3	0	0
Turnip celery	1	0	1	1	1	1	0	0	0	0
White head cabbage	0	0	5	5	5	5	0	0	0	0
Red head	0	0	0	0	0	0	0	0	1	1



cabbage										
Total	40	27	126	58	88	83	23	23	17	15
Ornamental plants										
Begonia	0	0	2	2	0	0	0	0	0	0
Sweet basil	0	0	1	1	0	0	0	0	0	0
Zynia elegans	0	0	1	1	0	0	1	1	0	0
Fenel-flower	0	0	0	0	0	0	0	0	0	0
Marigold	0	0	0	0	1	1	1	1	0	0
Rooster comb	0	0	0	0	0	0	1	1	0	0
Dahlia	0	0	3	3	0	0	1	1	0	0
Dimorfoteca sp.	0	0	0	0	0	0	0	0	0	0
Gypsophila elegans	0	0	1	1	0	0	1	1	0	0
Garden portulaca	0	0	0	0	0	0	1	1	0	0
Sunflower	0	0	0	0	0	0	0	0	0	0
Chaubad clover pink	0	0	1	1	0	0	0	0	0	0
Chinensis dianthus	0	0	2	2	0	0	0	0	0	0
Gazania sp.	0	0	0	0	0	0	1	1	0	0
Potmarigold calendula	0	0	0	0	0	0	0	0	0	0
Snapdragon	0	0	0	0	0	0	0	0	0	0
Cosmos sulphureus	1	1	0	0	1	1	0	0	0	0
Pimpernel species	0	0	0	0	0	0	1	1	0	0
Aster	0	0	3	3	2	2	0	0	0	0
Petunia	0	0	0	0	0	0	0	0	0	0
Great willow-herb	0	0	0	0	0	0	2	2	0	0
Nicotiana affinis	0	0	1	1	0	0	0	0	0	0
Sage	0	0	2	2	1	1	0	0	0	0
Verbena	0	0	0	0	0	0	0	0	0	0
Hollyhock	0	0	0	0	1	1	0	0	0	0
Pansy	0	0	1	1	0	0	0	0	0	0
Daisy	0	0	0	0	0	0	0	0	0	0
Com flag	2	2	4	4	2	2	2	2	1	1
Tulip	0	0	0	0	1	1	1	1	1	1
Ox-eye	0	0	0	0	1	1	1	1	0	0
Yellow pyre	0	0	0	0	1	1	0	0	0	0
China aster	0	0	0	0	0	0	0	0	0	0
Tuberoze	1	1	0	0	0	0	0	0	0	0
Alstroemeria	0	0	2	2	0	0	0	0	0	0
Anturium	0	0	4	4	0	0	0	0	0	0
Madonna lily	0	0	3	3	0	0	0	0	0	0
Chrysanthemum	0	0	3	3	0	0	6	6	0	0
Freesia	0	0	4	4	0	0	0	0	0	0
Pink	0	0	0	0	0	0	0	0	0	0
Strelitzia reginae	0	0	7	7	0	0	0	0	0	0
Common chrasanthemum	0	0	0	0	0	0	0	0	0	0
Saintpaulia	0	0	0	0	1	1	0	0	0	0
Total	4	4	45	44	12	12	20	20	2	2

Fruit trees, small fruits and trees										
Apricot	0	0	1	1	0	0	0	0	0	0
Californian Cypress	0	0	0	0	3	3	0	0	0	0
Japanese Cypress	0	0	0	0	1	1	0	0	0	0
Wax cherry	0	0	0	0	1	1	0	0	0	0
Cornel	0	0	1	1	0	0	0	0	0	0
Barberry	0	0	1	1	0	0	0	0	0	0
Chinensis juniper	0	0	0	0	3	3	0	0	0	0
Siberian crab apple	0	0	0	0	1	1	0	0	0	0
Blue spruce	0	0	0	0	1	1	0	0	0	0
Nectarin	0	0	0	0	0	0	0	0	0	0
Peach	0	0	1	1	1	1	0	0	1	1
Plum	0	0	1	1	0	0	0	0	1	1
Pyracantha	0	0	0	0	1	1	0	0	0	0
Euonymus latifolia	0	0	1	1	0	0	0	0	0	0
Russian olive	0	0	1	1	0	0	0	0	0	0
Cotinus coggygia	0	0	1	1	0	0	0	0	0	0
Sedum	0	0	0	0	0	0	1	1	0	0
Rose	1	2	19	19	4	4	12	12	4	4
Thuja	0	0	1	1	2	2	1	1	0	0
Total	2	2	28	28	18	18	14	14	6	6
Grape										
Fertile varieties										
For table	0	0	8	8	4	4	4	4	5	5
Apirene	0	0	1	1	0	0	1	1	1	1
For wine	5	5	21	21	9	9	23	23	8	8
For pleasure	2	2	0	0	1	1	1	1	3	3
Rootstock	4	4	10	10	0	0	2	2	0	0
Total	11	11	40	40	14	14	31	31	17	17
Mulberry	0	0	2	2	0	0	0	0	0	0
Hops	0	0	3	3	1	1	2	2	0	0
Total	0	0	5	5	1	1	2	2	0	0



THE PRESENT SITUATION OF ROMANIAN CROPS SEED PRODUCTION AND THE COVERED SURFACES WITH AGRICULTURAL SPECIES, DURING PERIOD 2000-2006

Crop	2000		2001		2002		2003		2004		2005		2006	
	Area ha	Production to	Area ha	Production to	Area ha	Production to	Area ha	Production to	Area ha	Production to	Area ha	Production to	Area ha	Production to
Cereals	134743	377866	203730	684363	187517	500948	172499	386201	158536	607490	129503	471322	114259	417379
Wheat	117158	333086	171555	584487	160973	434281	155127	349675	134853	523879	117350	435594	100427	374301
DurumWheat	234	488	157	327	192	427	327	487	254	677	236	866	321	734
Rice	27	70	84	245	45	142	50	136	141	574	1239	519	2831	
Barley	15119	40447	27260	86093	23998	60962	14151	30176	20246	72658	9810	27916	1978	36132
Oat	1846	2354	3749	9025	1441	2452	185	3280	2205	6808	717	1835	22	66
Rye	93	202	80	233	64	119	4	9	14	30	35	115	10	40
Triticale	485	1319	814	3033	804	2566	991	2438	822	3262	1041	3706	982	3275
Maize and sorghum	14272	16891	19340	33731	16141	26424	16233	30914	16029	41039	9924	29258	8867	27850
Maize	14242	16861	19155	33566	16131	26418	16233	30914	15901	40896	9922	29257	8853	27831
Sorghum	30	30	183	160	10	6	-	-	128	143	2	1	14	19
Oil and fibre plants	17707	16418	19527	20989	22176	19799	22467	25081	17753	23436	10794	11806	18216	25274
Hemp	283	63	358	141	225	108	251	114	237	101	91	43	375	174
Sunflower	7012	3213	5476	3587	4758	2936	6213	4667	6704	5520	6301	4185	6151	6207
Fibre flax	184	107	45	45	442	326	391	211	294	294	0	0	128	88
White mustard	2786	1359	7470	5110	11484	5683	8740	5446	6375	6619	1714	1253	3006	2758
Black mustard													5	2
Soybean	7226	10986	6041	11934	4786	10304	6682	14333	3733	9972	2080	5494	5161	12503
Oil rape	156	290	137	172	481	442	210	310	410	930	608	831	3390	3542
Leguminous food	464	382	523	557	171	169	30	45	119	115	33	32	3	6
Chick pea	464	382	523	557	171	169	30	45	119	115	33	32	3	6
Fodder plants	5170	4238	5568,5	5029	4600,3	3248	4061	3254	3961	3101	1573	1123,05	2192	2212
Forage grasses	817	297	628	439	582	327	721	303	872	668	655	516	692	669
Orchard grass	61	33	31	4	22	5	14	3	17	5	47	15,48	13	1
Sudan-grass	61	23	140	158	70	50	14	6	31	14	32	48	23	27
Millet														
Awless bromegrass	32	8	44	18	9	0,3	11	2	22	7	26	2,75	24	5
Fescue	110	32	52	16	50	11	55	10	45	10	91	39	43	6
Tall fescue	-	-	-	-	-	-	-	-	-	-	-	-	20	7
Red fescue	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crested wheat grass	193	56	65	85	244	152	465	191	538	532	374	378	439	561
Hybrid ryegrass	-	-	-	-	-	-	-	-	-	-	-	-	10	10
Perennial ryegrass	349	141	200	95	63	18	113	65	185	58	65	22	97	52
Timothy	11	4	44	12	24	8	2	0,4	12	5	10	1,18	23	-
Leguminous fodder	4526	2820	5242	4672	4144	3030	3987	3147	3989	4943,3	1573	1123,05	1493	1543
Phacelia	289	35	289	83	185	31	260	92	0	0	40	10	65	16
Fingers-and-thumbs	61	3	66	8	15	6	34	3	26	3,2	11	1,25		
Lucerne	2265	491	2662	742	1902	423	1581	368	2159	555	877	137	871	184

Field pea	1571	2076	1834	3330	1808	2261	1805	2551	1720	4338	385	847	461	1276
Spring pea	111	111	321	426	214	266	136	108	31	20	161	92	53	47
Samfoin	23	6	25	4	32	9	14	7	16	18	34	20	42	9
Red clover	226	98	285	79	188	34	157	18	37	9	65	15.8	1	11
Other fodder	322	-	-	-	-	-	-	-	-	-	-	-	7	1
Fodder rape	100	100	125	100	205	36	60	43	175	318	0	0	-	-
Fodder radish	198	61	178	68	240	47	5	5	0	0	0	0	-	-
Fodder beet	17	7	21	17	10	5	3	4	8	6	0	0	7	1
Fodder beet-cutting	17	1250	2.5	172	1.3	130	1	55	0	-	6	90	-	8
Aromatic and medicinal plants	37	21	138	110	108	53	577	895	-	-	11	13	238	-
Sweet beet	6	16	1.2	0.9	4.6	7.4	4	8.5	80	124	1.8	2.55	-	-
Total vegetables	1310	805	1079	1172,15	893	719,51	753,6	620,89	366	217	357	268	282	243
Bulbs vegetables	71	330	48	579	34	149	38	279	27	794	2,45	13,6	3	3
Cutting vegetables	108	16285	132	23793	94	13022	57	12048	61	14097	51	14865	35	6506
Seedlings vegetables	-	-	-	-	-	-	-	-	-	-	-	-	4	3886
Pepper	39	3	28	2	48	3.16	37	3	47	3	30	2	48,00	6,000
Cucumber	37	5	18	2	39	7	40	10	27	1	4	0.3	12,500	2,600
Comison	-	-	-	-	-	-	-	-	-	-	-	-	0,550	0,510
Onion	79	67	31	26	43	23	37	73	7	15	31	6	10,200	5,200
Bean	709	538	758	850	438	449	478	449	255	275	170	110	96,000	141,000
Bush bean	-	-	-	-	-	-	-	-	-	-	-	-	6,880	5,000
Pole bean	-	-	-	-	-	-	-	-	-	-	-	-	3,320	3,130
Pea with rugosity grain	103	128	150	245	155	189	87	75	66	110	30	20	36,300	49,300
Carrot	32	15	17	7	27	8	10	3	14	6	5	1,27	1,600	0,750
Eggplants	15	1	4	0,35	13	1,55	-	-	-	-	-	-	-	-
Spinach	82	42	43	31	76	31	17	4	42	21	23	6	4,200	2,000
Tomatoes	32	2	20	0,8	37	2,07	35	1,32	25	1,4	15	1	17,400	2,400
White head cabbage	9	4	10	8	17	5,73	2,6	1,25	19	16	6	3	3,200	2,100
Potato	3896	52677	4387	79165	2926	53591	2697	59465	2163	48003	1770	39856	2176	54004
Planting stocks	690	-	629	-	456	-	-	-	-	-	-	-	-	-
Total-wine	-	-	-	-	-	-	443	-	518	-	495	-	339	-
Graft leather	437	2066	413	1900	255	1090	289	1511	305	2857	304	2049	195,000	-
Root-stocks cutting	208	15793	180	13313	180	15337	134	13406	168	14175	125	9976	74,200	-
Grafted wines in first year	44	1942	35	1326	17	691	18	772	44	2412	65	3493	65,000	-
Grafted wines in second year	1	45	0,5	27	3	187	0,5	14,3	92	6	1	84	3,600	-
Root-stocks wines rooted	0,3	10	0,15	15	0,26	15,84	0,46	13,89	0,36	34	0	0	1,240	-
Planting stocks	303,83	-	248,08	-	250	-	-	-	-	-	-	-	-	10
Total fruit-growing	-	-	-	-	-	-	195	-	202	-	170	-	177	-
Fruit-trees	126,9	2436	117	2140	101	2237	-	-	-	-	-	-	-	0



grafts	-	-	-	-	-	-	-	-	87	1993	83	2355	163	8678	59	0
Fruit-growing root-stocks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	82	0
Cutting non-root	0,3	33	-	0,25	15	0,25	15	0,25	0,25	20	0,25	20	1,62	55	0,200	-
Field II	58	1275	51	53	1380	43	1380	43	48	1151	48	1151	47	1082	-	-
Field III	11	209	11	6,4	87,61	11	87,61	11	4	185	4	185	3	94	-	-
Graft branches	55	898	54	39	742	32	742	32	28	923	28	984	27	809	24,100	-
Fruit trees	11,43	-	15,74	8,80	-	5,66	-	5,66	-	-	6,5	-	2	153	4	0
Strawberry stolons	1,5	440	2,32	1,5	506	4,39	506	4,39	1456	1456	4,35	1185	7	1716	9	-
Planting stock	57,93	-	64	37	-	-	-	-	-	-	-	-	-	-	-	-
Dendrological	-	-	-	-	-	24	-	24	-	-	28,84	-	40	-	45	2
Trees	26,3	-	24,65	10,72	95,96	7,8	95,96	7,8	142	142	3,84	113,58	12	187	11	0
Shrubs	-	28,91	-	-	24,7	-	24,7	-	-	-	-	-	-	-	-	-
Ornamental shrubs	-	-	-	-	-	7,8	-	7,8	-	-	25	-	28	34	2	-
Flowers	2,72	-	1,65	2,57	-	2,02	-	2,02	-	-	0	-	7,61	-	10	0
Tobacco	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Hops	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-
Mushrooms	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0,004	0,070

ROMANIAN SEED PRODUCTION INSTITUTIONS WHICH MAINTAIN AND MULTIPLY THE REGISTERED BREEDS OF DIFFERENT CROP SPECIES

Institutions name	Crop species
Agricultural Research and Development Institute Fundulea	Wheat, durum wheat, maize, sweet maize, sorghum, true millet, hybrid sorghum X Sudan grass, barley, rice, triticale, sunflower, soybean, flax, turnip, forage crops (Sudan-grass, Alpha, orchard grass, fescue, hybrid ryegrass, Alexandria clover), bean, pea.
Agricultural Research and Development Station of Lovrin	Wheat, oat, turnip, sugar beet.
Research and Development Institute for Grassland Brasov	Blade, fingers and thumbs, Orchard grass, Tall fescue, blue-grass, creeping fescue, perennial ryegrass, timothy grass, white clover.
Agricultural Research and Development Station of Podu Iloaiei	Wheat, true millet, pea.
National Institute of Research and Development for Potato and Sugar Beet Brasov	potato, sweet beet
Grassland Research and Development Station of Vaslui	Awnless bromegrass
"Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine Universitatea de Agricultură	Pepper, pole bean.
Research and Development Institute for Flower and Vegetables of Vidra	Pepper, gumbo, cucumber, onion, savory, mushroom, field pumpkin, pumpkin, bush bean, pea, dill, egg apple, water melon, lettuce, radish, spinach, tomato plant, eggplant, celery, white head cabbage, cabbage, corn flag, tulip, little star, rose bush.
Superssem Commercial Society Arad	Pepper, cucumber, onion, savory, pumpkin, bush bean, turnip, pea, carrot, parsnip, parsley, musk melon, radish, salad, beetroot, tomato, cabbage.
Vegetable Research and Development Station of Bacau	Endive, pepper, onion, savory, bush bean, pole bean, turnip, cabbage, dill, carrot, eggplant, parsley, musk melon, sweet maize, garden radish, radish, lettuce, beetroot, flower-garden tomato plant, celery, cabbage, begonia, sweet basil, marigold, dahlia, clove pink, ox-eye, salvia, pansy.
Vegetable Research and Development Station of Buzău	Pepper, sweet basil, cucumber, onion, pumpkin, field pumpkin, musk melon, water melon, radish, celery, salad, spinach, tomato plant, cabbage, sweet basil, pansy, snapdragon.
Vegetable Research and Development Station of Iernut	Onion, turnip, parsnip, garden radish, white head cabbage.
Vegetable Research and Development Station of Ialomița	Pepper, cucumber, onion, pumpkin, bush bean, pea, parsley, water melon, leek, radish, garden radish, lettuce, beetroot, cabbage.
Research and Development Station for Fruit Tree Growing Cluj Napoca	Cherry, apple, pear, gooseberry, black currant, red currant.
Unisem Commercial Society Bucharest	Pepper, cucumber, bush bean, pea, eggplant, radish, musk melon, beetroot, tomato plant, ox-eye, hollyhock, corn marigold turnip.



Research and Development Station for Growing Sand Plants of Dabuleni	Monkey nut, cowpea, melon.
ITC Commercial Society Bucharest	Sunflower, marigold, beet.
Kiskun Romania Commercial Society Bihor	Maize, sunflower.
Limagrain Romania Commercial Society	Wheat, durum wheat, barley, maize, sunflower, rape, pea, tall fescue, ryegrass.
Romsiz Ghimbav Society Braşov	White mustard.
Popandron Niculai	Pepper, onion.
Agrosel Commercial Society Cluj	Tomato

