ROMANIA:

COUNTRY REPORT TO THE FAO INTERNATIONAL TECHNICAL CONFERENCE ON PLANT GENETIC RESOURCES

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Note by FAO

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CHAPTER 1
Introduction

Romania, the country with a surface of 237,500 sq. km and 22,755,260 inhabitants, lies in the south-east of the European central part, on the inferior flow of the Danube with exit at the Black Sea. To the east, 2,500 km separate it, on ascending line, from the Urals and 2,500 km, on descending line, to the west, from the cape of St. Vincence in Iberian peninsula. The 45° parallel crosses Romania passing through the Danube Delta, while the meridian of 25° eastern longitude crosses the city of Fagaras found in the center of the country.

1.1 NATURAL CONDITIONS

1.1.1 The Relief of Romania

The relief of Romania is distributed harmoniously: the mountains form an arch in the central part of the country and represent 31% of the total surface. Hills and plateaus with a surface of 33% surround the Carpathian mountain chain, and the plains, situated to the south and to the west of the country represent 36% of its total surface.

The mountains belong to the Alpino-Carpatho-Hymalayan mountains system and are distinguished in terms of peaks direction, altitude, geological structure and the position towards the big Depression of Transilvania. The Carpathian system contains the following mountainous chains: the Oriental Carpathians, of volcanic origin, with a maximum height of 2,400 m, the Meridional Carpathians, the highest in the country, with a maximum altitude of 2 ,544 m and the Western Carpathians, calcareous, rich in karst phenomena and less massive with a maximum height of 1,849 m.

Inside the Carpathian arch is found the Transilvania Depression with a hilly relief with heights of 400-700 m. The Carpathians are doubled by a hillock unity with an average height of 500 m, made of friable rocks that favour the slope processes and that have generic name of Subcarpathians.

To the south-east of Romania, between the Danube and the Black Sea lies the Dobrogea Plateau, with a maximum height of 467 m and to its north lies the Danube Delta, the point where the river is separated in three arms unequal as a volume of carried waters and in which 78% of the soil surface is submerse. To the west of the country there is an area of plain with average heights of 90-120 m, and between the Meridional Carpathians and the Danube lies the Romanian Plain that descends from 300 m height in the north-west to 10-30 m in the south-east and that represents the main agricultural area of the country.

1.1.2 Hydrographic Network

The rivers network has a beam aspect being tributary to the Danube directly or by the intermediary of the Tisa, a river to the north-west of the country. Rivers have variable flows with a maximum in April-June and an energetic potential of 33,450 Gwh yearly, capitalized greatly by the system of hydroelectric plants, Rcmania has over 3,500 lakes but only 0.9% of them overtake a surface of l sq. km. Bigger are the lagoons and the coasts across the shore of the Black Sea and the storage lakes of the hydroelectric plants.

1.1.3 Climate

The climatic potential specific to the agricultural territory of Romania is similar to the most productive agricultural regions from the f-temperate zone of the northern hemisphere. So the radiant energy is comprised between 110-112 kcal/cm^2 and the thermic energy oscillates between 2,800-4,300 ^{o}C (the sum of the global temperatures >0 grade C).

At a local scale the country climate has a great variety of shades determined especially by the complexity and the breaking up of the relief and by the peculiarities of the circulation of atmosphere. So, for instance, the invasions of the cold and wet air in north-west and west are slowed down and blocked by the Carpathian chain. In the warm period of the year is remarked a decrease in the air temperature on the northern and western slopes of the Carpathians. On the contrary, on the eastern slopes, the air masses become warmer as the compression during their descent to valleys and depressions.

In winter the cold air that moves from the east of the European continent to the Balcanic peninsula often invades the Romanian territory that determines air temperature decreases until -20^{o}C and even -30^{o}C.

As a production natural factor for the country agriculture a special importance has the climatic sources of plains and hills. The radiant energy specific to these areas is comprised between 115-130 kcal/cm^2 yearly. The average air temperature in July oscillates between 20-30^{o}C and the average thermic amplitudes overpass 22^{o}C. Annual quantities of rainfalls are comprised between 530 mm in the western part of the country and 750 mm the eastern one. The increased thermical potential (the annual sum of the temperatures higher than 10^{o}C is comprised between 1,400-1,600^{o}C) and the frequent alternation of clear sky and periods with cloudy sky and a regime of humidity in the air and soil good for plants demands, make of the Romanian territory one of the most favourable areas as for the climatic aspect for the most crops (winter wheat, winter barley, oats, maize, sunflower, peas, beans, sugar beet, potato etc.). Winter which is relatively mild allows a slow evolution of the vegetation of winter crops even under the snow (cryptovegetation), frost destruction being sporadic.

As an unfavourable phenomenon in many low areas of meadow and hill is mentioned especially the excess, of humidity on the soil surface. The rainfalls of continental type are variable at big intervals and unequal, being more abundant at the beginning of summer. There are generally abundant rainfalls that overtake 1,000 mm yearly, maxima being over 1,400-l,600 mm in the mountain area.

CHAPTER 2
Agriculture

Romanian agriculture represents l6% of the conditional revenue and involves 37.8% of the busy population. In order to understand better the trends in the agricultural field of the country, it is well to analyse in a historical context the main characteristics of the agricultural production determined not only by the specific geoclimatic aspects but also by the customs and the needs of the population. So, aqriculture was from ancient times the base trade of the inhabitants of these territories. In 1938, for instance, the year of the best economic results in the interwar period of Romania, 76.4% of the active population was occupied in the field of agriculture. The situation remained practically unchanged until 1950 when the tendency of country industrialization determined a slight change of place of the population in this field (the population occupied in agriculture decreased till 74% and that occupied in industry increased with 3-12%). The forced industrialization policy led to the attraction of a greater part of the rural population to towns. In 1986, the population occupied in agriculture decreased rapidly till 28.2%. At the same time, it took place a process of intensive agriculture by the endowment of farmers with agricultural machines, fertilizers and pesticides. These measures also determined the modification of the main systems of agriculture and property on the agricultural fields. After 1991, as a result of the Law of Land Property, increased the weight of population in agriculture.

2.1 A WAY TO ORGANIZE AGRICULTURE

In Romania, before 1989, agriculture was organized in state agricultural enterprises, institutes and agricultural research stations (that formed the agricultural state field), production agricultural. cooperatives (that constituted the cooperative field) and the private field made of farms in the mountain area. As a characteristic of this way of organization was the excessive centralism with all its consequences.

After the Revolution of December 1989, according to the Law of Land Property no.18/1991, that statutes the new way of organizing the agriculture

in tightly dependence with the new situation created in the country transformations took place in agriculture, being promoted the process of privatization of the agriculture. So are born the juridical and non-juridical agricultural associations, individual farms that form the private field of the agriculture.

In the state agriculture are constituted trading companies with state capital and the institutes and the research stations are stated by the Law no-18 as public field.

At the level of 1994, from the total. agricultural surface of 14,793,100 ha, 10,336,400 ha belong to individual farms and agricultural associations.

2.2 THE WAY OF USING THE LAND

Romania' s total surface is 23,750,000 ha, of which 39.33% represents arable land, l4.26% lawns, 6.27% meadows and 2.52 a vineyard and orchards (Appendix l). From the total agricultural surface of the country, the arable land represents 63%; the biggest surfaces being occupied with cereals for grains (70% of the whole arable land)and technical plants (13% of the whole land). The arable land is found, mainly in the plain area, its surface being diminished to the hill and mountain area to give place to lawns and meadows, while the orchards are spread prevalently in the hill and plateau area.

2.3 SURFACES AND PRODUCTIONS OF THE MAIN CROPS

In 1994, at the top of the agricultural production are the cereals for grains (wheat, maize, rye, barley and rice) that occupy a surface of 5,704 thousands ha and yield 17,173.5 thousands tones.

Next are technical plants with a surface of 908.6 ha and a global yield of 4,159.1 thousands tones, potatoes with a surface of 289.6 thousands tones and a global production of 3,185.6 thousands tones.

The leguminous plants are cultivated on 216 thousands ha and an yield of 2,357.5 thousands tones was obtained. The fruit trees occupy a total surface of 295.8 thousands ha with an yield of 1,453 thousands tones. The vineyard

surface is 223.6 thousands ha and has an yield of 954 thousands tones of grapes.

2.4 TRENDS IN THE VEGETAL PRODUCTION

The dynamics of cultivated surfaces as well as the weight of the main crops depend on many factors among which the relief and climate conditions are decisive. A great influence have the social factors and the customs of populations, economic factors and the policy for agriculture. If, in the inter-war period, in Romania were cultivated especially cereals for grains, the surfaces cultivated with these crops decreased at the same time with the increase of the production per ha.

The social events of 1989 determined a decrease of the interest in agriculture and, in the next period, once with the promulgation of the Law of Land Property to be manifested a trend of increasing the surfaces cultivated with cereals for grains. The same trend is remarked in the case of the cultivation of leguminous plants for grains, while the surfaces cultivated with technical plants diminished significantly. In change, it is remarked an increase of the surfaces cultivated with fodder plants, that may be explained by the simplicity of necessary maintenance works. Today it is remarked an increase of the surfaces cultivated with potatoes, sugar beet, sunflower, an important food for population. Though the interest in the species with industrial destination decreased, one may foresee a demand of the market will determine producers to reorientate to their cultivation.

The grape yield remained at the same level in comparison with the period before the Revolution of 1989 because of the maintenance of the vineyard surfaces. The same situation is found as for the fruit yield where, though the surfaces remained practically unchanged there were significant yields.

2.5 LIMITATIVE FACTORS OF THE AGRICULTURAL PRODUCTION

The level of the agricultural productions is influenced by a series of biotic, abiotic and socio-economic factors that may cause the diminution or even the loss of production.

The passage from one social system to the other generated transformations in agriculture - the main branch of the Romanian economy. For instance, abolishing the centralized organization system of the agriculture and the regain into ownership of the ancient landowners led to the crumbling of agricultural lands. Because of the reduced financial possibilities of landowners, the agricultural production had to suffer because of the impossibility of observing the proper technologies.

Draught, frost, excess of humidity, erosion process represent limitative abiotic factors of the agricultural production. For instance, the draught of 1946 and 1947 decreased the agricultural production with 33% in comparison with 1938, a similar phenomenon being recorded in 1991, 1992 and 1994.

The increase of crop efficiency depends to a great extent on the fight against diseases and pests. In the case that are not applied control measures, some crops may be partially or totally destroyed. The estimation of the damages caused by diseases and pests in Romania shows that for the main crops these represent minimum 24% (Bobes, 1993). In order to control diseases and pests one may appeal to a series of means that applied in isolation or in combination reduce more or less crop losses. In future one must pay a greater attention to the integrate control, which constitutes a system of pathogens and pests control, taking into account the environment and the dynamics of species, by using all the consistent techniques and methods and maintaining them to a level where no change is registered.

2.6 THE DEPENDENCE DEGREE OF THE COUNTRY ON THE AGRICULTURAL PRODUCTION

In the inter-war period, Romania exported agricultural products on European markets. The weight of the agricultural products in the balance sheet of the Romanian exportation decreased continuously in the period of l945-1989, especially because of the industrialization policy and the exportation of industrial products. After the Revolution of December 1989, changes that took place in the reorganization of the agriculture as well as some natural calamities (the draught in 1991), Romania had to import potato, sugar, wheat and rice to satisfy the needs of population.

Today, one may say that Romania satisfies entirely the needs of food from the own production, creating at some agricultural products, opportunities for exportation, the import of agricultural products having no vital significance for the country population.

CHAPTER 3
Native Phitogenetic Resources

3.1 SPONTANEOUS SPECIES RELATED TO THE CULTIVATED PLANTS

Romanian vegetation contains, among the 3,350 species of vascular plants, not only wild forerunners of the cultivated plants but especially spontaneous species related to crop plants. In the Appendix 2 there are 131 spontaneous species related to the cultivated plants: agricultural plants (37 species), lawns plants (73 species) and medicinal plants (21 species). Some populations were used, as initial material, for the creation of some native varieties: *Lolium perenne, Dactylis glomerata, Festuca pratensis, Festuca arundinacea, Festuca rubra, Bromus inermis, Phleum pratense, Trifolium repens, Lotus corniculatus, Onobrychis viciifolia, Beta trigyna*. There are also used spontaneous species for the breeding of some genetic characteristics in crop medicinal plants as: *Matricaria chamomilla, Trigonella coerulea, Mentha arvensis, Mentha aquatica, Diqitalis lanata, Atropa belladonna, Ocimum basilicum.*

All the species in the Appendix 2 may be collected in different spreading ecological areas and are not, until now, threatened by the genetic erosion.

The diverse ecological conditions in Romania favoured the appearance of a great number of ecotypes and populations adapted to different ecological conditions. Only in the case of the species Lolium perenne were identified over 7,000 of local populations. In Romania, lawn phytogenoses occupy a surface of 4.5 mil. ha. In many other species of different groups of plants there are many local populations. Among them, there are plants that have valuable genetic characteristics concerning resistance to wintering, to draught (leguminous plants), fodder yield (green mass) etc. Many of these features could be used in the breeding programs of cultivated plants.

In Romania there are species in the spontaneous flora that have never used, but which could constitute important native sources of vegetal produce or gene sources in plant breeding. An important number of spontaneous species

belonging to the following qenera: *Amaranthus, Allium, Brassica, Linum, Anthyllis, Lathyrus, Trigonella, Glyceria, Artemisia, Digitalis, Papaver, Anemone, Salvia, Rubus, Ribes, Rosa* could present an interest in the following fields: food, industrial, medicinal, fodder. So the genus Amaranthus with the 9 species (*retroflexus, hybridus, cruentus, blitoides, crispus, albus, graecizans, deflexus, lividus*), spread on different areas of the country with diverse ecological conditions, by the big rate of protein and essential aminoacids from seeds and green mass, present a food and fodder importance. Taking into account that the larger part of the native spontaneous vegetal germplasm belongs to the lawn flora, we consider that some spontaneous species could be used as gene sources for:

A. Fodder

Phleum montanum
Festuca violacea
Carex curvula
Poa alpina
Poa media (all spread in the mountainous area with a good fodder value)
Alopecurus pratensis
Arrhenatherum elatius
Trisetum flavescens
Festuca pseudovina
Coronilla varia
Dorycnium herbaceum
Medicago arabica
Medicago minima
Onobrychis arenaria
Onobrychis montana
Vicia cracca
Vicia villosa

B. Eroded soils with vegetation

Brachypodium pinnatum
Festuca valesiaca
Bromus erectus
Cynosurus cristatus
Agropyron pectiniforme (species resistant to drought)

C. Wet soils

Poa trivialis
Poa silvicola
Thyphoides arundinacea
Trifolium fragiferum
Trifolium hybridum (in the cold areas of the country)
Trifolium resupinatum (in the south area of the country)

D. Sandy soils

Festuca vaginata
Secale silvestre (sand fastening)

E. Salt saturated soils

Trigonela monspeliaca
Beckmania eruciformis
Medicago falcata
Puccinelia limosa
Melilotus officinalis

F. Turf

(sportive fields with vegetation, parks, grounds, works of ecological reconstruction of the degraded lawns in the hill and mountain area):
Agrostis tenuis
Agrostis stolonifera
Festuca heterophylla (tolerant at shadow)
Poa nemoralis (tolerant at shade)
Cynodon dactylon (resistant to drought)
Festuca ovina spp. sudetica
Poa annua.

3.2 VARIETIES OF LOCAL POPULATIONS AND OLD CULTIVARS

In Romania are still used in individual farms old cultivars on surfaces relatively limited. Especially, in hillock and (or) intramontaneous depressions are still cultivated local populations of *Zea mays, Phaseolus vulgaris, Cucurbita pepo, Papaver somniferum* (in all country areas that contain the above mentioned relief forms), *Triticum monoccocum* (Transylvania - the Western Mountains), *Fagopyrum esculentum* (north of Bucovina, Maramures, the Western

Mountains), *Vicia faba* (especially in Bucovina and Maramures), *Cannabis sativa* (Maramures, the Western Mountains, the Bistrita zone), *Linum usitatissimum* (the Western Mountains, Maramures).

There are, at least, two reasons for which the old cultivars are still kept and used by the peasants in the respective areas: tradition and perfect adaptation of these plants to the local pedo-climatic conditions. The Romanian Government left the peasants the choice of maintaining, keeping and using these local populations. Many varieties and hybrids were introduced in crops, so limiting the spreading area of the old local populations. After the establishment of the Suceava Vegetal Genetic Resources Bank, was created the possibility of collecting, evaluation and conservation of these local populations. In Romania was made no evaluation of the importance of traditional crops, concerning the economy of the individual farm and the family food security, being almost impossible to do a complete inventory of local populations.

To the extent that plant breeders have created and are creating new sorts of hybrids adapted to all ecoloqical conditions in the country, the cultivators give up to the use of traditional populations, excepting some isolated areas with a heavy access (intramontaneous depressions).

CHAPTER 4
Phitogenetic Preservation in Romania

In situ and *ex situ* phytogenetic preservation in Romania is achieved in the first case in natural reservations and at farmers, and, in the second case, in the institutes and agricultural research stations that make programes of plant breeding and by the Suceava Veqetal Genetic Resources Bank, a governmental institution.

4.1 *IN SITU* PRESERVATION

In situ preservation protects plants in their natural habitat where they developed and are well adapted to the environment conditions.

This type of preservation includes the species of plants from reservations and national parks as well as the sorts and the local populations from farms.

In Romania, concerns about the setting up of parks and natural reservations existed beginning with the end of the XIXth century.

Today in Romania there are l93 protected areas, of which:

- reservation of the world natural patrimony - the Danube Delta - with a total surface of 591,200 ha;
- 2 reservations of the biosphere: Retezat, with a surface of 54,400 ha and Rodna with a surface of 56,700 ha;
- 12 national parks with a total surface of 287,084 ha;
- 52 forestry natural: reservations, with a total surface of 113,668 ha;
- 126 botanical natural reservations with a surface of 4,952.5 ha.

The preservation activity of vegetal genetic resources presented in parks and natural reservations is coordinated, at a national level, by the Romanian Academy, by the Commission for the Protection of Nature Monuments.

The preservation of the vegetal germplasm represented by populations and traditional varieties of the individual farms is not-guided by an authorised and competent staff, because it is a dynamic preservation, the local material, being permanently replaced by the improved one.

4.2 *EX SITU* PRESERVATION

In Romania the preservation of vegetal genetic resources *ex situ* is made, mainly, by the Suceava Vegetal Genetic Resources Bank and plant breeding centers from institutes and agricultural research stations (Appendix 3).

4.2.1 The Suceava Vegetal Genetic Bank and its Collection of Germplasm

The continuous loss and degradation of important vegetal genetic resources, having as effect the diminution of the biodiversity, a phenomenon pointed out in the developing countries but especially in the developed countries led to the necessity of setting up in Romania, too, of a specialized institution in gathering, evaluation and preservation of the stock of native vegetal germplasm.

So, in 1990, was born the Vegetal Genetic Resources Bank with the headquarters in Suceava, no 17.1 Decembrie 1918 Avenue, an institution with a national character financed from the state budget and meant to keep the national collection of national phytogenetic resources.

Having 3 great objectives to fulfill: gathering, evaluation and preservation of vegetal germplasm, the Bank is organized in three fields of activity homonymous to its objectives where activate 12 specialists (agronomists, biologists, chemists, information scientists) and 10 technicians or laboratory assistants.

The Bank also has rooms and apparatus for studying the seeds and biochemical, cytologic, physiological, genetic analyses etc.

For stocking and analysing data that accompany the preserved genetic material in the Bank there is an office of electronic calculation, well gifted. The Bank has only one type of collection (active), though there are facilities to keep a

base collection, the refrigerating equipment does not correspond technically to this purpose.

The samples of seeds that make up the Bank active collection and that represent a specific part of the genetic diversity known for certain group of plants (cereals and technical plants, leguminous plants, medicinal and aromatic plants, fodder plants) are kept in glass jars of different size, hermetically closed with a threaded cover. The actual number of accessions is 9,410 (Appendix 5a and 5b), 74% of these being represented by a native material. The local populations of maize, wheat, rye, grain, beans etc. constitute 80% of the native germplasm which special value consists in the presence of some genes for resistance to some biotic and abiotic factors.

In a smaller proportion are represented the wild forms (4% native and 45% foreign forms) and the bred ones (15%; native and 48% foreign forms)

A small part (20-25%) of the material preserved in the Gene Bank is in duplicate, but kept in unclimatized conditions, in the donor institutes and agricultural research stations.

The main objective of the collection is to ensure biological material, to the programme of plant breeding. It is obvious that the next years the collection increases the number, mainly, by the collections of legumes, cereals and technical plants, aromatic, medicinal. and fodder plants that are found in the institutes and agricultural research stations. Wild species and primitive populations will be obtained as a result of the gathering activity, by an exchange with other world gene banks or from botanical gardens.

Except the seed collection, the Vegetal Genetic Resources Bank has initiated an *in vitro* active collection for Solanum tuberosum.

The preserving conditions are those corresponding to a slow growth (temperature +6^{o}C, light intensity 200 lux). This collection contains a number of 41 accessions. There are also preserved in field collections 468 native populations of Solanum tuberosum.

Seed processing/Storage facility

Compartments

For preserving seed samples in the Vegetal Genetic Resources Bank there are the following conditions:

•4 cells for the base collection, each of. 15.9 sq. m without refrigerating equipment

•4 cells for the active collection, each of 23.5 sq. m

•a compartment for seed drying (9.8 sq. m)

•3 working compartments, two of l4.7 sq. m and one of l7.64 sq. m

Operational conditions

Compartment	Temperature	Humidity
Cells for the base collection	-200C	not checked
Cells for the active collection	+ 4C	-/-
Drier	20-30°C	7 g/kg
Labs	20°C	

The humidity content of seeds for keeping is 5-7% and the minimum value allowed for the germinative ability is 85%.

The Cooler Equipment for the active collection consists of 2 groups compressor condenser with a power of 6,000 kcal/h each, coupled at a common vaporizer that cools the air flow.

The Dryer Equipment is a MD 300 dehumidifier with the following characteristics: the air reactivation power is 1,850 W, total power 2 100 W process air flow 285 m^3/h and reactivated air flow 70 m^3/h.

4.2.2 The Collection of Phytogenetic Resources of Romanian Institutes and Research Stations

In 1 995 Romania bas a rich stock of germplasm for the crop plants (Appendix 4a & 4b) made of 93,000 samples, of which 71% of native nature. Among these, the local populations and the wild forms constitute 2.6 and 1,9% respectively, the rest of 95.5% being bred forms, the lines (of cereals, sunflower, beet sugar etc.) are predominant (40%).

Analysing the composition of the samples of foreign nature it was found that the situation is similar, if we refer to the volume occupied by the wild forms (3.4%) and the old cultivated populations (8%). From all the bred forms 59% are breeds (cereals, leguminous plants, flax), 26% lines (cereals, leguminous plants etc.) and 1% hybrids (wheat, maize, beet, sunflower etc.).

The numerical record of the collection is obtained by the species Solanum tuberosum with 30,796 samples followed by cereals, 2,161 samples and Beta vulgaris with 20,309 samples.

Among the cereals, wheat and maize are well represented in the collection with 8,552 8,051 samples, respectively, that represent 9.21% and 8.87% of the whole Romanian phytogenetic resources collection.

The germplasm national collection in fruit trees, strawberry plants and fruit bushes contains a number of 5,538 samples belonging to 21 botanical genera (Appendix 6). From these, 26% are native forms with a composition in which prevail local populations -89%, the rest of 11% being breeds.

As for the structure of samples of foreign origin the situation is reverse, 83 being breeds and 4 and l.3% are wild forms or old cultivars. These collections are kept in unclimatized conditions, in "field collections" and 2% in *in vitro* crops.

In the *ex situ* preserving activity are implied the 7 botanical gardens in the country with a total surface of 150-170 ha and that lodge native species, adapted to local ecoloqical conditions and foreign species.

4.3 EVALUATION AND MULTIPLICATION OF PHYTOGENETIC RESOURCES

4.3.1 Evaluation of Phytogenetic Resources in Romania

In Romania the evaluation of phytogenetic resources is made according to the aim of their use.

The material gathered by the Suceava Vegetal Genetic Resources Bank is estimated according to the IPGRI descriptors in field and laboratory conditions. The Suceava Vegetal Genetic Resources Bank has 5 ha of arable land for field research as well as specialized laboratories (biochemistry, cytology,

seedology, plant protection etc.) for research works. The evaluation work is made by well trained scientific research workers (in agriculture, biochemistry, biology, informatics) and by technicians and laboratory assistants.

The institutes and the breeding centers do research works and observations for the germplasm evaluation in the selection fields of the respective centers. In the frame of each unit according to the objectives of the breeding programmes, the material is analysed from the genetic, physiological, morphological point of view, tests of resistance to diseases and pests etc. In the research institutes and in other research units are studied the phytogenetic resources in the plant laboratory or vegetation houses. In the Suceava Vegetal Genetic Resources Bank are the following laboratories:

- biochemical laboratory where the phytogenetic resources gathered are analysed from the biochemical point of view according to the IPGRI descriptors;
- a laboratory for phytosanitary control for the determination of diseases and pests;
- a cytologic laboratory where are made cytological determinations in seeds stored for the identification of cytologic modifications that take place in seed during storing;
- a seedology laboratory for testing the viability of seeds preserved in the bank.

According to the directions of use of phytogenetic resources, in the institutes and breeding centers and at the Suceava Vegetal Genetic Resources Bank there are 3 main objectives:

- when the phytogenetic resources are represented by cultivated local varieties, populations, races, the evaluation objective is to know if plants may be used in production directly or as initial material in breeding works;
- when the material gathered is made up of wild species, the aim of evolution is to point out the genetic variability potential and, on the other side, to trace out genes of resistance to diseases and pests to discover new forms with an increased content in protein, fats, essential aminoacids etc;
- another objective of the evaluation of phytogenetic resources in Romania is to characterize medicinal and aromatic plants for the identification of new sources of raw materials for the pharmaceutical industry.

In the frame of these objectives one has in view the fact that no matter haw many negative features a plant has, it is necessary to characterise and to stock it because one never knows when it could be useful.

The evaluation in field of genetic resources at the Suceava Vegetal Genetic Resources Bank is done in adequate conditions but only for a reduced number of samples, because of the raised cost of the evaluation works. As for the evaluation activity in laboratories, it is achieved with difficulty because of the uncompleted endowment of laboratories with adequate apparatus and the lack of reagents. So that the results of the evaluation activity reflect faithfully the plants biologic potential it is recommended to set up some evaluation centers in the main ecological zones of the country where will work well-trained persons.

4.3.2 Multiplication of Phytogenetic Resources in Romania

After the samples are gathered or sent by the Institutes and breeding centers, botanical gardens, high agronomic education institutes, these are registered. Then it follows their sowing, phased in years, for the determination of descriptors and in the case that the number of seeds is reduced or the germination is under 85% a multiplication of the material to be stored in bank is done. Plant species with vegetative multiplication, especially the potato, are kept *in vitro*. The 5 ha of the experimental field is enough for the multiplication of the germplasm existing in the bank. For protecting some samples of special interest the multiplication has place in the 7 unwarmed qreenglasses of the bank with a total surface of 0.25 ha.

CHAPTER 5
Activity of Documentation

The importance paid to the data that accompany the seeds preserved in gene banks is the same as that paid to seeds themselves and the quality of a good documentation implies a better use of the preserved material. A good system of documentation will increase the work efficiency in a gene bank and make possible the communication and the cooperation with other similar institutions.

In the Suceava Vegetal Genetic Resources Bank as in other world gene banks the information system is grafted on the old system of keeping the documents specific to each activity in the bank. The new system of information was designed and developed at the same time with the existence of the traditions of the old system that can not be ignored The compartment that responds of data management is the Computing Office. This is endowed since 1992 with a AT-286 micro-computer and a matrix printer. The data of our collection are stored in a data base using a programme package SIRAG, created in the system FoxPro.

Information concerning the preserved genetic material are divided into 3 groups:

- passport data
- conservation data (store)
- characterisation-evaluation data

Any accession from the database may be represented by a list of pairs of numbers where the first belongs to the set of descriptors and the second belongs to the set of descriptor values. This way of representing accessions has a high degree of flexibility as the description of an accession easy be done evolutively and afterwards spread in an unlimited way, making easy the manipulation of the whole volume of data.

Its modular structure and the endowment with a friendly interface make of the programmes package SIRAG an adequate means of data administration. The possible operations on species, accessions, descriptors and descriptor values are:

insert, modification, delete, sort, selection on a certain criterium, display or listing.

Almost 80% of the accessions are introduced into the database with the passport data and the conservation data. While the material is studied are introduced the characterization-evaluation data. The correlation between the quality of documentation and the use of information is positive the well-informed samples leading to a better use.

The result of statistical processing, reports and other lists are obtained even at printer or on the microcomputer screen.

In Romania, institutes and stations have organized the documentation of collections, using, since 1989, microcomputers of the PC family and an adequate software.

As the genetic preservation is a global responsibility, Europe is trying to make a network where gene banks may communicate and exchange information.

In 1994 the "Genetic Resources Center" of Wageningen, Holland, in collaboration with IPGRI made a complex programme sustained financially by the Holland Government for 3 years, of increasing the quality of documentation systems and its standardization (Technical Support to East European Gene Banks to Improve Access to Privatized Plant-Breeding to Germplasm Collections).

The programme has in view the allocation of a sum, separated in 2 years from which the Suceava Vegetal Genetic Resources Bank bought other 2 microcomputers DX-386 and a DX2-486 and 2 printers, one of them with laser. The second year of the programme is for the achievement of a standard in exchange of information.

After the achievement of these actions, the Suceava Vegetal, Genetic Resources Bank could take part in fact to the change of information in the frame of an organized network not only with the eastern countries but also with the western European countries, change of information that could be achieved by the intermediary of the electronic mail.

CHAPTER 6
The use of Phytogenetic Resources in Romania

The use of phytogenetic resources in Romania in plant breeding programmes is achieved in agricultural research stations (Appendix 3) at the following groups of plants:

Cereals for grain:

wheat
barley
rye
triticals
maize

Leguminous plants for grains:

beans
peas

Technical plants:

flax
hemp
sugar beet
potato
sunflower

Fodder plants:

perennial

leguminous plants

perennial gramineaes

Medicinal plants:

crawfoot
artichoke
camomile
mint
common sage

Vegetables:

pepper
tomato
carrots
onion
cabbage

Fruit-trees:

apple tree
pear tree
plum tree
cherry tree

Vine.

The ratio of using the native phytogenetic resources in breeding programmes is:

Specification	%
wheat	35
barley	23
rye	26
triticals	33
maize	47
peas	41
beans	38
flax	15

Specification	%
hemp	65
sugar beet	70
potato	50
sunflower	24
perennial gramineaes	24

Specification	%
perennial leguminosae	47
tomatoes	45
pepper	54
apple tree	15
pear tree	10
plum tree	10
cherry tree	40
vine	38

In the phytogenetic resources collection of the Suceava Vegetal Genetic Resources Bank there are samples belonging to some plant species that until now have not been used in the breeding programmes in Romania, as it follows:

Specification	No. of Samples
Amaranthus spp.	101
Anenone virginians	2
Arnica montana	4
Lathyrus pratensis	3
Tropaeolum majus	1
Lalemantia iberica	3
Gypsophila elegans	2
Cosmos bipinatus	2
Anthyl1is vulneraria	13
Coronil1a spp.	3
Brachypodium spp.	6
Glyceria spp.	4
Cynosurus spp.	3

The access of the breeders interested in the existent samples in the bank storehouse is free, except the samples protected by the donor.

6.1 THE BREEDING ACTIVITY IN ROMANIA

The main objectives of national breeding programmes aim at achieving some productive cultivars of superior quality with increased resistance to diseases and pests, to unfavourable environment conditions, able to capitalize the specific conditions on the Romanian territory. The main objective had in view at the beginning of the modern breeding was the production increase. Today the main aim of breeding programmes is to increase the quality of cultivars to achieve a constant production to reduce the genetic vulnerability.

The methods used in plant breeding in Romania are those used in the whole world, both in autogamus plants and in allogamus plants. Among these we mention selection, hybridization, inbreeding heterosis, mutagenesis and polyploidy. In the last time were made research works at a cellular and molecular level, using the methods of genetic engineering (the technology of recombined DNA).

The varieties and hybrids created in Romania and that are used in crop in 1995 are presented in the Appendix 7. The breeding activities at national level are for satisfying national needs of food and for developing exportation chances.

The breeding activity is coordinated by the Research Institutes and the Academy of Agricultural and Forest Sciences.

6.2 SEED AND PLANTING MATERIAL PRODUCTION IN ROMANIA

The systems of seed production in Romania have 2 distinctive stages that allow the elite seed production and the seed of inbred lines and simple hybrids and the reproduction of the elite seed or the creation of the hybrid seed for production.

To the first stage are characteristic the works for improving biologica1 features, obtaining on one side the seed “superelite base” and the “superelite” in research laboratories and on the other side the “elite” seed made in seed production farms in institutes and research stations on the Romanian territory. The second stage in the frame of commercial societies with state or private capital and in familial associations. Here, the reproduction of elite seeds is in view, maintaining by corresponding works the features already created.

Seed and planting material production covers the whole necessary both for the growing of field plants (maize, wheat, sunflower, beet, potato, leguminous plants for grains, textile plants) and for the growing of leguminous plants, fruit-tree, vine.

CHAPTER 7
Political, Juridical, Legislative Frame and Measures of Phytosanitary Protection in the Field of Vegetal Genetic Resources

7.1 JURIDICAL FRAME AND PRESENT PROGRAMES OF THE ACTIVITY DISPLAYED IN THE FIELD OF VEGETAL GENETIC RESOURCES

The events of December 1989 caused deep changes in political juridical and social-economic life in Romania. A new juridical and legislative frame was created concerning the activity in the field of scientific research inclusively in the field of vegetal genetic resources. In this way the Law no. 35/ 1991 created the juridical frame for bringing foreign capital in industry, agriculture and in scientific research and technological development. The law created the legislative frame for bringing foreign investments in the activity of scientific research, ensuring many facilities as for the income tax, exceptions from custom taxes on units and apparatus and some additional facilities proposed by the government. The juridical regulation for the activity in the field of vegetal genetic resources was materialized by setting up and working according to the **Government Decision no. 371/1990.** of the Suceava Vegetal Resources Bank. It is an institution of national interest subordinated to the Food and Agricultural Ministry by the Government Decision no. 940/1999, with juridical personality and financed from the state budget. Since 1993, the Suceava Vegetal Genetic Resources Bank is a member with full rights, of the International Institute of Vegetal Genetic Resources (IPGRI) with the headquarters in Rome, Italy.

The Suceava Vegetal Genetic Resources Bank had the initiative that the whole activity on the line of vegetal genetic resources in Romania should be displayed according to the National Committee of Vegetal Genetic Resources. This committee is a non-governmental organism made up of 23 members, representatives of institutes and plant breeding station and botanical gardens.

The whole staff co-opted in this committee corresponds to the highest demands as for the professional competence, this staff being also involved in achieving some major projects in breeding, linked to the agricultural development in Romania. The Suceava Vegetal Genetic Resources Bank

displays its activity according to a **Working and Organization Rule** advised by the Board of Directors of the Bank, the National Committee of Vegetal Genetic Resources and approved by the Decision no. 224/l995 by the Academy of Agricultural Forest Sciences, Bucharest.

In January l995 was discussed and adopted in the Romanian Parliament the Law of the right on the intellectual property.

7.2 LEGAL REGULATIONS CONCERNING THE PROTECTION MEASURES OF VEGETAL GENETIC RESOURCES

In Romania there are legal regulations concerning the protection and preservation of *in situ* and *ex situ* vegetal genetic resources. Reservations, natural parks and botanical gardens represent *in situ* collections, respectively *ex situ* of vegetal genetic resources.

Besides identification and inventorying, these sources of germplasm must be protected: so was emitted the **Decree no. 237**, in 1957, concerning the protection of nature monuments on national plan. On this occasion was set up the **Committee of Nature Monuments** (under the Romanian Academy) as well as county councils for nature protection);

- the **Law no./1973** included some supplementary measures concerning the protection of nature monuments (reservations, natural. parks, botanical gardens);
- the **Government Decision no. 340/1992**, where is presented the list of reservations, natural parks and botanical gardens in counties and some norms concerning the protection of the collection included. At the request of the Food and Agricultural Ministry, the Suceava Vegetal Genetic Resources Bank made a material necessary to a government decision project for the ensurance of safety (protection) of the national vegetal genetic stock.

Taking into consideration the important role of seeds (the most used way of preserving vegetal genetic resources) in obtaining high agricultural production (quantitatively and qualitatively) was adopted the **Law no. 13/1971** concerning producing, using and checking the seed quality and planting material for the vegetal production. There is under way of discussion and approval in the Romanian Parliament a new law of seeds which will line up the legislation and the terminology in this field to the European request.

7.3 LEGAL REGULATIONS AND MEASURES OF PHYTOSANITARY QUARANTINE

The Government Decision no. 252/1952 regulates some measures concerning the organization of the phytosanitary quarantine for plant protection against pest, diseases and weeds. There are set up organs of phytosanitary quarantine and is introduced the regime of phytosanitary quarantine. This decision also approves the **Regulation of Phytosanitary quarantine**, where:

- Chapter I - foresees the list with the products at which refer quarantine measures at import;
- Chapter II - foresees the check of the import, exportation and transit phytosanitary quarantine;
- Chapter III - establishes some charges of the organs and phytosanitary quarantine.

The Government Decision no. 1 634/1953 approves the instructions concerning the work of nurseries and the circulation of the planting material. **The Government Decision no. 2 498/1969** establishes a series of measures concerning the finding and the penalization of minor offenses on line of plant protection.

The Government Decision no. 17/1975 foresees some measures of quarantine to control Synchitriun endobioticum
The Law no./1982, the annex no., presents some measures of ensuring the forest hygiene estate

The Government Decision no. 35/1988 foresees some measures to prevent spreading and to reduce damages caused by Rhyzomania in beet crops.

In the last years, the intensification of the cooperation between Romania and foreign partners in the field of vegetal genetic resources was materialized by an increase of biological material changes (especially seeds) that. Determined the necessity of adaptation of new measures on the phytosanitary quarantine. Limiting the growing of some imported vegetal genetic resources appears in the case that biological material does not correspond to the required norms concerning the protection measures and phytosanitary quarantine.

CHAPTER 8
International Collaboration

We are convinced that in the conditions of our days, the necessity and the opportunity of the international collaboration became an important request, the Food and Agricultural Ministry through Suceava Vegetal Genetic Resources Bank is trying by different ways and means, to initiate and develop collaboration relations with organizations and institutes in the field, both in the interior of the country and especially on the international level. This conception arises from the fact that Romania, since 1992, signed at Rio de Janeiro, the consent to the Biological Diversity Convention, convinced by the importance for present and future of this attitude.

As a consequence of the acknowledgment of the significance of the consent to the Biological Diversity Convention, Romania, respectively the Suceava Vegetal Genetic Resources Bank, was invited to become a member of the International Plant Genetic Resources Institute (IPGRI), with the headquarters in Rome. By this measure, it was succeeded in creation of some special advantages, materialized by donations of lab apparatus, computers for the Bank Calculation Office, scholarships in foreign countries and documentary material.

The consent to IPGRI facilitated the link between the Suceava Gene Bank and other Gene Banks as the Gatersleben Gene Bank, Germany, the Izmir Gene Bank, Turkey, the Bari Germplasm Institute, Italy, the Adelaide Gene Bank, Australia, the Sadovo Gene Bank, Bulgaria etc.

Together with some of these banks were organized in Romania common actions of collection, of which we remark the expeditions organized with the Gatersleben Gene Bank on this occasion were gathered over 500 samples.

On the initiative of IPGRI and with its support, in 1993, in Prague the leaders of Gene Ranks and the chiefs of calculation offices of the east European countries, were invited for the analyse of the situation of organizing and functioning calculation offices. The chiefs of calculation offices took part in Prague, in October 1994, to the first documentation technical session.

In the frame of bilateral collaboration, the Suceava Gene Bank exchanged biological material with the N.I. Vavilov Institute of Plant Industry (VIR)-Sankt Petersburg, Russia, the Lyubliana Biology Faculty, Slovenia, the Tapiosezele Agrobotanical Research Center, Hungary etc. There are bilateral collaborations between the Maracineni Fruit-Growing Production and Research Institute and the Stations of Michigan and Kerneisville from USA, Angers and Bordeaux, France, the Chisinau Fruit-Growing Institute, the Republic of Moldova, the Bologne University, Italy.

The specialists of the less developed countries must visit gene banks with tradition and name in this field; organization and material sustain of some common teams of collection: endowment with some technical equipments etc. One of the most important necessities in the frame of international collaboration is the organization, without delay, of some gathering actions, especially where the loss speed of vegetal genetic resources is high. We suggest making actual again "the red list" and entrusting the gathering of the threatened species, to some multinational teams. We suggest that in Balcanians, Romania, Bulgaria, Cyprus, Greece, Albania and Turkey be helped to organize in a common exploitation and gathering team, on the territory of each country and the gains of this actions be divided among participating countries, according to a preliminary agreement.

In order to develop the international collaboration the staff that works in gene banks must be trained. Taking into account the urgency in some fields, especially as concerns prospectation and gathering we consider that it is more to do. We suggest instruction be make as 2-3 week courses on fields (gathering, evaluation, preservation).

For an easier communication, we suggest that in the frame of official meetings organized by IPGRI be also accepted as official language the French language.

CHAPTER 9
International and Regional Support as well the Prospects of Improving the Activity

9.1 INTERNATIONAL AND REGIONAL SUPPORT

In Romania, by the setting up of the Suceava Vegetal Genetic Resources Bank, as well as the constitution of National Committee of vegetal genetic resources, the activity on the line of vegetal genetic resources meet a serious improvement both on technical plan and organizational plan. So, were organized, on scientific basis, gathering expeditions, in interdisciplinary teams were made studies of evaluation and characterization of the gathered material, was made an inventory of all the collections in Romania (National Collection), international exchange of resources, change of experience with other gene banks, specialization of some research workers in foreign countries etc.

However, because of lacks and difficulties of Romania, determined by the passage from the supercentralized economy to the market economy, financial and material restrictions limit the development of some activities with favourable repercussions in improving, in a short time, and in better conditions of the whole activity. Phytogenetic resources of the whole world areas are, finally, a good of the whole Terra, all world countries, rich or pour, must be involved in solving one of the most important problems of our days-phytogenetic preservation.

The measures taken until now and the results obtained prove that by a common effort the deteriorating effects on vegetal genetic resources must be diminished. This wish imposes measures of mutual assistance between the states of the world.

As for Romania, in spite of its difficulties, made great efforts to stop the loss of phytogenetic resources. But only this effort is insufficient, having in view that every lost day in an activity weighs more in the balance sheet of the measures that must be taken. In this way, we ask help to the International Community,

through FAO, IPGRI and other international organizations, to be supported in the following problems:

In the field of staff preparation and informatization

- creation of conditions for that the bank researchers may know the results of researchers in this field, especially as concerns the aspects of evaluation and preservation.
- Because the Suceava Vegetal Genetic Resources Bank is a new institution, with a young staff and because in Romania there is no other similar institution with experience, it needs to gather evidence in all theoretical and practical aspects in the field of vegetal genetic resources. We propose the support of the bank for the organization of a library with reports, treatises, communications from the specialized magazines.
- We feel the need that our research workers participate to the achievements of some research projects next to the experienced research workers of the advanced gene banks.
- For the attenuation of genetic erosion and for the identification of new vegetal genetic resources is necessary Romania's participation to mixed expeditions of gathering in other ecological areas than those in Romania.
- In an European plan, the Center of vegetal genetic resources in Holland initiated a 3 years project for the programmes of vegetal genetic resources in the countries of the east of Europe where Romania is included. After the achievement of this project, Romania proposed the integration of the documentation system of east European countries in the European documentation system and even international.
- For using and ensuring safety on larger periods of time of vegetal genetic resources, Romania, respectively the Suceava Genetic Vegetal Resources Bank, used for genetic resources with vegetative reproduction in vitro preservation, by imposing of some conditions of slow growing. In future, is proposed the bank support for improving these preservation techniques and the introduction of the preservation by cryostock.

In the field of endowment:

- The endowment of the Suceava Vegetal Genetic Resources Bank with equipments of cold making, for preservation to -20^{o}C. Today it works only the refrigerating installation for preserving at +4^{o}C.

- The Bank is weakly endowed with lab apparatus as: germinators, drying stoves, apparatus for chemical analyses, microscopes for cytologic analysis etc.
- A special problem is provisioning with chemical reagents (growing stimulators, organic compounds etc.). In Romania these substances are not produced and their import is very expensive.
- We solicit support for Romania's participation in achieving the research project for the preservation of cloned DNA.
- The adequate endowment for achieving biochemical analysis at a molecular level, for the identification of genetic diversity of vegetal resources based on genetic stamps (RF, LP, RTL, PCR).

9.2 PROSPECTS OF IMPROVING THE ACTIVITY

The achievement of the proposed objectives, both those in the National Plan and those expected, by international or regional support, will improve evidently the activity on the line of vegetal genetic resources in Romania.

So, by the intensification of gathering actions which must be a priority in the tandem gathering-evaluation-preservation, the volume and the diversity of genetic resources of each country and the global genetic patrimony will be increased, offering to plant breeders sources of valuable genes to create new superior genotypes. The importance of the existence of some valuable genes is greater today and especially in future, when, by the methods of genetic engineering (the technology of recombined DNA), there is the possibility to transfer them, by isolation, cloning and expression in the cells of other living forms, that allows the creation of new forms of plants and new types of animals and the control of some diseases.

But, in order that genes be used in plant breeding programmes they must be preserved and evaluated. Unknowing or partial knowing of genetic resources limit their use. By a corresponding preservation of genetic resources in checked conditions there is a safety of their preservation on long periods of time and as a result, their use in terms of the objectives of plant breeding programmes of diverse historic stages. That's why, in the chapter "International support" we proposed the endowment of the Suceava Vegetal Genetic Resources Bank with an equipment of cold making, for chambers with -20^{o}C.

Another problem important in future is the setting up of some gene banks in which to be kept fragments of cloned DNA proceeded from bacteria, dregs genomes from different plant and animal species. In this way, research workers that wish to work with a certain recombined DNA, the one that contains the wished gene or genes, may secure from the gene bank the clone with the desired DNA.

We consider that in the 10 years taken into consideration by FAO for the future international programme concerning the genetic resources, the problem of keeping DNA clones in gene banks must be taken into consideration, a series of studies and tests being done in multidisciplinary teams with well trained specialists, financially sustained by FAO and also by efforts at national level.

CHAPTER 10
Proposal for "the Global Action System"

Romania wishes to propose for the "Global Action System" the following measures:

1 For the ex situ preservation FAO, respectively IPGRI, as well as other organizations and international or regional institutions, governmental or ungovernmental, must declare the first three years (1996-1998) as the years of prospection and gathering of phytogenetic resources. We propose it because the loss speed of genetic resources is higher and as it is natural, to evaluate and preserve, one must first identify and gather. For this, the following measures must be taken:

1.1 The elaboration of some International Regulations that establish the conditions for a country to make prospectation and gathering expeditions on the other country territory. We consider that the present practice is unfair as the developed countries that, thanks to economic and financial opportunities, created, in a shorter time, bred cultivars, replacing earlier, in the crop, old forms and traditional local populations. For this reason, they are searching for new gene sources, which are found in the undeveloped countries that did not succeed in replacing entirely the traditional forms of the crop. It is important to raise the problem of studying the opportunity that countries which offer native germplasm collections to other countries to benefit as fair partners. The advantages could be:

- on the whole period as there is the genetic resource, it remains, wherever it is, as a property of the country and respective staff or person;
- access to the results of evaluation. The receiver of resources must be compelled to put to the disposal of the donor the results of the research works carried out and the information concerning genetic resources obtained from the partner;
- in the case of publishing in speciality magazines or in other publications, the donor should be accepted as joint author;

- if from the gathered material, the beneficiary isolates valuable forms, interesting for the breeding works, the receiver must be compelled to put them gratis at the disposal of the donor;
- the donor participation, if he is a research worker, to the activity of teams for the material research;
- professional preparation of the research workers in the gene banks with reduced staff instruction opportunities, in centers endowed with apparatus, specialists, documentation.

1.2 The activity of gathering national teams by the organization of prospection and gathering by the support of respective governments. Where the internal support is impossible, we suggest a help from the International Community.

1.3 The organization of a mixed gathering team in areas where flora presents interest for the countries engaged in gathering. Each participating country will profit by the gathered resources equally.

2 The following 3 years (1999-2001) will be declared "Years of evaluation and preservation of vegetal genetic resources".

The material gathered must be the object of evaluation and characterization, according to common standards, with only these features and characteristics necessary to revealing the material. In this period, in the frame of evaluation, must be emphasized the genetic, cytogenetic, physiologic and biochemical study of the material.

As for the preservation, we consider that FAO should institute a commission that visit gene banks for knowing the preserving conditions of resources. Where there are checked preserving conditions FAO must ensure the necessary means or, with the agreement of the respective country, transfer them to other banks with ensured conditions. During the 3 years, national efforts associated to the regional and international effort should solve definitively the preservation problem.

Concerning this aspect, IPGRI should indicate clearly optimal temperatures (technical and economic) of preserving (on medium and long periods of time), taking into account the actual situations when

the raised energy cost and reduced financial possibilities create serious problems especially to the east European countries.

3 The period 2002-2005 should be devoted to "THE USE OF VEGETAL GENETIC RESOURCES.

The use of vegetal genetic resources knows a continuous process that is developing according to the objectives of breeding programmes, the used material, the used methods and the breeder knowledge. We propose it, taking into account the accumulations we count to be achieved in the other two stages. We consider that one might tackle with a greater chance the use of vegetal genetic resources.

The used methods and techniques of vegetal genetic resources, both conventionally and unconventionally should be in the advertisement to IPGRI that organizes in big centers, with name in the field, the preparation of the specialists in the young gene banks of those with reduced material and financial possibilities.

Among the 3 stages proposed can not be marked any final limits as in each stage will be made gathering, evaluation preservation and use of vegetal genetic resources. We have in view that in every stage the proposed objective must be put into evidence in comparison with the other objectives.

For *in situ* Preservation

In situ preservation, in Romania, has 2 aspects:
a. the preservation of the old sorts and local populations at farmers;
b. the flora preservation of natural reservations.

The prospect as for the *in situ* preservation at farmers is dark because plant breeders create, permanently, improved genotypes, more adapted to local ecological conditions, so that, every year, they replace the local material by the bred material. In this situation the only alternative for keeping this local material is its gathering and its deposition in gene banks.

Concerning the protection of natural reservations we consider necessary to organize some studies for knowing existent genetic potentials in these reservations, because the studies carried out until now are only botanical ones. We consider necessary that in the action global plan on l0 years enter the world natural reservations.

Some Managerial Problems

We consider that in the Account of the International Technical Conference must be specified the duties and the action required of FAO and IPGRI. In the paper "The Global System of Action for Preserving and Using Genetic Resources" is asserted that: "The international network of the *ex situ* basis collection will work under the leadership of FAO and the technical assistance will be ensured by IPGRI". How would practically act these international devices to fulfill these duties ? In the same material one refers to the "transfer of germplasm collections", "the access to these resources and the promotion of some fair uses". We wish to know by what international regulations are achieved these actions. How the "fair use" is done ?

Concerning the leadership by FAO of the international network of basis collections, we consider that this charge, with all its complexity, is hard, even impossible to be achieved in regional and subregional centers. We propose that, under the aegis of FAO, be organized a regional subcenter in the Balcanians where all the countries of this geographical area should take part. There would be advantages both for FAO and for the respective countries.

ANNEX 1
Romanian Forest Genetic Resources

Introduction

This report summarizes the data, from 1994, concerning Romanian forest genetic resources. The report took into consideration the FAO/IPGRI methodology with its 8 chapters.

CHAPTER 1 INTRODUCTION TO COUNTRY AND ITS FORESTRY SECTOR

Romania is placed in Europe, at about 46 north latitude and 25 east longitude. The country has a long range of mountains, hills, plains, a lot of rivers and a temperate climate that favoured a high genetic diversity in woody species.

The forests cover about 26.8% of the whole territory, of which 95% belong to the state and are managed by ROMSILVA Autonomus Administration of Forests.

The indigenous forestry flora consists of 78 woody species, of which the most representative ones are listed in table 1.

Average volume growth per year and hectare, for the main species is, as follows: *Picea abies* 7.0 m^3, *Abies alba* 6.4 m^3, *Larix decidua* 5.8 m^3, *Pinus sylvestris* 5.2 m^3, *Fagus sylvatica* 5.5 m^3, *Quercus robur* 5.3 m^3, *Quercus petraea* 4.8 m^3, *Quercus frainetto* 4.3 m^3.

Other figures concerning tree growth:

- Average annual current increment: 5.6 m^3/year/ha;
- Average volume per hectare: 217 m^3;
- Average volume for harvesting: 14,000,000 m^3;
- Total wood volume for all the forests: 1,350 millions m^3.

Export takes place mostly by sale of furniture.

The forests do not suffer major losses because of pest and disease attacks, except *Ulmus sp*. which have been attacked, for about 50 years, by *Ceratocystis ulmi, fungi*. Also, for about 10-15 years, the forests are suffering because of pollution and drought.

CHAPTER 2 INDIGENOUS FOREST GENETIC RESOURCES

The forest genetic resources consist of the main tree species that form the forestry fund .According to the 1994 data, this fund covers 6,341 472 ha; out of this, only 6,223,416 ha represent afforested areas while 118 056 ha represent unafforested areas within the forest (Table 2).The coniferous species cover 1,910,766 ha (30.7%) of which 1,431,670 ha *Picea abies*, 311,452 ha *Abies alba* and the rest represents other coniferous species, *Pseudotsuga menziesii* as non-indigenous species, among them broad-leaved species cover 4,312,650 ha (69.3%) where the *Fagus sylvatica* with 1,909,187 ha is the main species followed by the *Quercus sp*. with 1,142,500 ha.

The major indigenous species which are collected and cultivated within virginous or quasi-virginous forests, are as follows:

Picea abies
Abies alba
Larix decidua
Pinus sylvestrzs
P.nigra var banatica
P.cembra P.mugo
Fagus sylvatica
Acer pseudoplatanus
Ulmus montana
Populus tremula
Betula verrucosa
Alnus viridis
A.incana
Sorbus aucuparia.

There are some other economically and ecologically important species which, in the past, were components of the virginous forests, such as:
Quercus petraea
Q.dalechampii
Q.polycarpa

Q.robur
Q.pedunculiflora
Q.frainetto
Q.pubescens
Q.cerris
Acer platonoides
A.campestre
Ulmus glabra
Carpinus betulus
Populus alba
P.nigra
Alnus glutinosa
Salix alba

and some other species of *Salix mainly* because man's destructive activity; these forests no longer keep their virgin state.

The management of the forest genetic resources is achieved by the qualified technical personnel, that belong to the Romsilva Regional Forest Districts. This work carried out on the basis of the management plan directions drawn up by the Forest Research Institute and approved by the Economical Commission of the Ministry of Waters, Forests and Environmental Protection. According to the management plan, the following activities should be made in forest genetic resources:

- cutting poor or other undesired trees in order to preclude them from the reproductive process
- new seed stands selection and their *in situ* conservation;
- protection against harmful factors;
- interdiction of making new plantations near seed stands to be conserved promulgation of new legislation and regulations.

Because of the *Ceratocystis ulmi* fungi combined, perhaps, with the pollution, the following Ulmus species are in danger: *U.glabra, U.foliacea, U.procera* and *U.minor.*

The environment pollution stress effect has been observed in all woody species but those suffering most are *Quercus sp.*, *Robinia pseudoacacia* and *Abies alba.*

CHAPTER 3 NATIONAL CONSERVATION ACTIVITIES

3.1 Natural distribution of the main native forest species

Picea abies. The natural range covers both parts of the Carpathian Mt., between 538 m to 1,860 m altitude. It is the most important species among the conifers and grows both in pure and mixed stands. At low altitude it stands to appear mixed with *Abies alba*, *Fagus sylvatica, Acer pseudoplatanus, Ulmus montana*. At high altitude it grows in mixed stands together with *Larix decidua, Pinus cembra, Pinus mugo, Sorbus aucupania*. Between the two extremes, it forms a continuous band of *Picea abies* pure stands. Natural regeneration is very good for this species.

Fagus sylvatica, is the most important brood-leaved species; naturally distributed from low hills to the mountains. Its lower elevation limits are variable between 400 m to 800 m while the upper limits occurs mainly between 1,200 m and 1,400 m, but occasionally it can be found up to 1,700 m altitude. The species has a very good natural regeneration and, therefore, it possesses a high genetic diversity which must be conserved.

Quercus petraea has its natural range on the hills and at the lower part of the mountains. .Its upper limit is 800 m in the East Carpathians, 1,000 m in the Southern Carpathians and 900 m in the Western Carpathians. It can form both pure and mixed stands with *Acer sp., Tilia sp.,Cerasus avium, Fagus sylvatica, Quercus robur.*

Q.petraea together with *Q.dalechampii, Q.polycarpa* and *Q.robur* have a considerable economic importance; their wood is suitable for numerous purposes including as a veneer of high quality. For about 10-15 years it (and other *Quercus sp.*) has suffered from drought and pollution that caused a slight decreasing of its natural area. At present, its fructification rarely occurs because of drought and pollution; this situation is also valid for all *Quercus sp.*

Romanian relief consists of plains, hills and high mountains, - the Carpathians - that form a continuous curved range with the highest elevation of 2,542 m. The timber line is located at about 1,900 m and is formed by different species. Pinus mugo prevails and forms large stands. Then Picea abies, Larix decidua and Alnus viridis appear only as single trees.

At a lower elevation appear compact Picea abies pure stands or mixed stands of *Picea abies* and *P. cembra, P. abies* and *Larix decidua* associated with *Sorbus aucuparia, Alnus viridis, Alnus incana.* At its lower part, the *Picea abies* subzone is mixed with some *Abies alba, Pinus sylvestris* and *Fagus sylvatica* populations. Below to this, i.e. at lower part of the mountains and at the upper part of the hills can be found *Fagus sylvatica* pure or mixed with *Quercus petraea* stands. Within such populations, some other species may occur, such as: *Acer pseudoplatanus, Populus tremula, Ulmus montana, Betula vernucosa, Fraxinus ornus.*

On the lower hills and on the plains, the forests are formed by numerous species, such as: all species of *Quercus, Carpinus betulus, Ulmus glabra, Fraxinus excelsior, Tilia sp., Cerasus avium, Populus nigra, P.alba, Acer platanoides, A.campestre, Alnus glutinosa Salix sp.*, etc.

3.2 Why the need for the *in situ* and/or *ex situ* conservation of the main forest genetic resources?

There are numerous reasons why there is a need for the conservation of forest genetic resources, but the following are important for Romania:

- For maintaining the present genetic diversity of all species;
- Because, according to the monitoring data, the present state of the health of forests is not too optimistic;
- Because, according to some prognoses, due to the general warming, the desertification process will take place in the southern part of Romania; consequently, a lot of species and ecosystems will be in danger;
- Because, 4 species of *Ulmus* are in real danger and because some other species (*Quercus sp., Robinia pseudoacacia, Abies alba*, among others) are evidently suffering from the combined effects of drought and pollution. For the above reasons, the forest genetic resources conservation is compulsory.

3.3 Conservation of forest genetic resources

Despite the fact that our government signed the Strasbourg documents, in Romania there is no official program for forest genetic resources conservation.

However, this activity was started, before the Strasbourg conference, by the following institutions: (1) Forest Research and Management Institute;

(2) ROMSILVA Autonomus Administration of Forests and its predecessors;
(3) Romanian Academy through its Sub-Commission of Natural Resources.

There is no a national information system on forest genetic resources. However, each of the 3 mentioned institutions possess some separate basic data on the resources selected by them.

3.3.1 *In situ* conservation

National parks. According to the national legislation and regional resolutions, 13 national parks were created. Out of 397,761 ha total area, about 145,000 ha (i.e. 2.3% of the total forests area) represent net forest genetics resources for the main indigenous species (Table 3).

Natural forest reserves (Table 4). Forty-eight natural forest reserves were created with an area of 4,887.4 ha. Such forests are important from different points of view, and are protected by the Law No./l973.

Seed stands (Table 5). About three decades ago, the forestry authorities, including the Forest Research and Management Institute started an extensive program aimed selecting the best seed stands within both natural and artificial populations.

Table 4 shows:

- 2,912 seed stands where 1,555 (53%) were coniferous and 1,357 (47%) were broad leaved species;
- Total seed stands was 70,178.6 ha, of which 32,886.0 ha were coniferous and 37 292.6 ha, were broad-leaved species;
- Out of 32,886.0 ha coniferous, and 37,292.6 ha broad-leaved species 80% and 88%, respectively, represent natural populations *in situ* conserved.
- Table 4 gives some other details about Romanian seed stands. Natural Populus sp. and Salix sp. stands. (See details in table 11, part 1)

3.3.2 *Ex situ* conservation

Artificial seed stands. Table 5 column 5 shows the following:

- Total area with planted seed stands is 8,495.1 ha, i. e. 12% of total seed stands;
- Out of 8,495.1 ha, 78% consist of coniferous and 22% of broad leaved species;

Those stands have good phenotypical characteristics but, unfortunately, their origin is unknown.

Seed orchards (Table 6). Since 1960 extensive establishment of seed orchards has taken place in order to produce improved seeds for afforestation. The initial material consisted of some thousands of plus-trees selected according to their fenotypical traits, such as: growth; rectitude, branch thickness, frost resistance, etc. Using their clones and half sib families, 972.8 ha of seed orchards have been established where 597.8 ha (61%) were coniferous and 375.0 ha (39%) were broad-leaved species (Table 6). This table shows that all species, except Tilia sp., are seed producing. It must be stressed that seed orchards effectively maintain and increase the frequency of desired genetic characteristics.

Provenances. Table 7 demonstrates that 504 different geographic sources of 9 species from Romania as such as from abroad have been studied in 67 field tests. Total planted area was 98.5 ha. Most of these trials are 15...20 years old. In all cases significant differences among the provenances were noticed in respect of their height growth, frost resistance and other traits.

These provenance trials represent valuable forest genetic resources. **Half sib progeny trials** (Table 8).The biological material used for these tests consisted of:

- 112 families of Fagus sylvatica planted on 8.0 ha in 4 field tests;
- 123 families of Pinus nigra planted on 1.69 ha in 3 different tests

The 140 P.cembra and 81 Fagus sylvatica families are under nursery test. Full-sib progeny trials (Table 9): In 1977 a genetic resistance improvement program was started; the main objective was to improve Pinus strobus resistance against Cronartium ribicola. In the frame of this program, the fast growing but susceptible P.strobus was crossed with P.peuce and P.wallichiana as resistant species to the above parasite. The hybrids listed in table 9 incorporated in their genotypes fast growth and resistance to Cronartium. They represent valuable genetic resources.

Clonal collections. Table 10 shows that 780 clones of Larix sp., Picea sp. and Pinus sp. were planted on 21.0 ha area.

Populus sp. and Salix sp. experimental plantations. (See details in table 11, part 2).

Populus sp. and Salix sp. "mother plants" for scion collection (See details in table 11, part 3).

CHAPTER 4 USE OF FOREST GENETIC RESOURCES

Romania has a national program for better forest seed production. Such seed is produced by selected seed stands and by clonal and family seed orchards.

Genetic material from seed stands and seed orchards is a primary source for planting in afforestation programs.

Seed production by selected seed stands. As stated in chapter 3, 2,912 seed stands for all native and non-native major species in Romania were selected according to their phenotypic characteristics. These stands represent the best in the country. Each seed stand was delineated and thinned of crooked and other undesirable trees; such trees must not participate in the pollination process.

The collected seed from these stands were used in the same or similar regions according to our national regulations. Usually, these seeds are used only until the more permanent seed orchards become available; they are also used in the years when there are no seed crop in seed orchard.

Seed stands are semipermanent seed production areas operated on the principle that several crops will be harvested following the response to initial thinning.

Seed production by seed orchards. The standard method of producing genetically improved seed in operational quantities is to use seed orchard approach.

Romanian seed orchards are plantations with selected clones and progenies which are isolated or managed to avoid or reduce pollination from outside sources. They are not solely for genetic improvement of a single specific trait; however, active growth and resistance to some diseases and climatic factors were primarily taken into consideration during phenotypical selection. Two types seed orchards were established: clonal seed orchards and seedling orchards.

Clonal seed orchards were established by using grafts from plus trees and seedling orchards were established with the half sib progenies of the plus trees.

Most of our seed orchards are 20 to 30 years old and all, except *Tilia sp*. are seed-producing (see table 6).

Romanian seed orchards are first-generation orchards because they resulted from untested plus trees. It is now necessary to test the genetic worth of the parents and then to eliminate poor genotypes from orchards. Unfortunately, for economic reasons, it is not possible to test so many plus trees.

CHAPTER 5 NATIONAL GOALS, POLICIES, PROGRAMES AND LEGISLATION

As earlier stated, Romanian forests are administrated by the regional districts, that are sub-units of the ROMSILVA Autonomus Administration of Forests. These organisations are responsible for forest policy and management, including forest genetic resource management.

In its activity ROMSILVA is based on the following legislation: (1) Forestry Code; (2) Law no. 2/1987 regarding Conservation, Protection and Development of Forests and their harvesting; (3) Law no.9/1973 "Environment Protection; (4) Law no. 58/1994 "Adoption of the documents from the Rio de Janeiro conference concerning biological diversity; (5) Resolution 2 of the Ministerial Conference for the Protection of Forests in Europe held in Strasbourg in 1990; (6) Documents adopted by the second Ministerial Conference on the Protection of Forests in Europe, held in Helsinki; (7)Law no.69/1994 for adoption of the Convention concerning international trade with wild species of fauna and flora in danger of extinction; (8) Decret no.237/1957 concerning Protection of Natural Monuments; (9)Documents of the International Union for Conservation of Nature and Natural Resources (IUCN).

The above mentioned legislation ensure the management and policy of the forestry fund and the conservation of the forest genetic resources

Theoretically; there is an unique National Program of the Genetic Resources coordinated by the National Committee of Vegetal Genetic Resources but unfortunately this committee has a very limited capacity of decision and in addition has no funds, except Suceava Gene Bank.

The author of this report feels that, in the area of forestry there is no a true national program for genetic resource conservation and there are no funds for a such purpose, even trough the Strasbourg Conference was adopted.

CHAPTER 6 INTERNATIONAL COLLABORATION

Romanian forestry institutions maintain international collaboration with the following organizations:

- C E E - concerning research on *Fagus sylvatica* provenances where the Forest Research and Management Institute has been involved;
- International Union of Forestry Research Organizations (IUFRO)where Forest Research and Management Institute, participates actively, through its scientific activities;
- Laurentian Forestry Centre, Saint-Eoy, Quebec, Canada; the collaboration consists of breeding *Pinus strobus* for Cronartium ribicola resistance.
- FAO/IPGRI/EUFORGEN: this collaboration is just beginning and we hope that our government will pay the annual contributions.

CHAPTER 7 NATIONAL NEEDS AND OPPORTUNITIES

It is necessary to:

- have a single program for forest genetic resources conservation even through several institutions are involved in it;
- have a financial support in order to promote efficiently the forest genetic resources conservation;
- take also into consideration for *ex situ* conservation some important exotics, such as Pseudotsuga menziesii and Pinus strobus;
- have, at least 1-2 researchers involved only in forest genetic resources conservation; at present, this job is only voluntary;
- manage the preserved stands in order to maintain the desired genetic composition;

- for national authorities to understand that the need for conservation of genetic material in forest trees is evident and not arguable;
- understand that it is not necessary to conserve hundred of thousands of individuals that contain the same desired gene complexes; at most a few thousands such trees are usually sufficient;
- avoid confusion between conservation of forests for ecological and a esthetic reasons and those for gene conservation; the former requires large areas, but this should not be interpreted as the need for equally large areas for gene conservation per se, i. e. a few well-chosen forest stands of moderate size will serve the gene conservation purpose well;

Urgent need: as this activity is new, good training for the national coordinator of the forest genetic resources is necessary.

CHAPTER 8 PROPOSALS FOR A GLOBAL PLAN OF ACTION

(a) To set up a sub-regional gene bank where countries from the some geographic area could conserve some genetic resources.

(b) To take pollen into consideration for *ex situ* conservation on a larger scale.

(c) To organize international reciprocal visits for a better knowledge of the forest genetic resources management.

This report was prepared by the national coordinator of the forest genetic resources.

Table 1 List of the main indigenous woody species in Romania

Coniferous

1 *Picea abies*
2. *Abies alba*
3. *Larix decidua*
4. *Pinus nigra var.Banatica*
5. *P.sylvestris*
6. *P. cembra*
7. *P.mugo*

Broad leaved sp.

I. *Fagus sylvatica*
2. *Quecus petraea*
3. *Qdalechampü*
4. *Q.polycarpa*
5. *Q.robur*
6. *Q.pedunculiflora*
7. *Q frainetto*
8. *Q. pubescens verrucosa*
9. *Q.cerris*
10. *Q.virgiliana*
11. *Populus alba*
12. *P.nigra*
13. *P. tremula*
14. *Acer pseudoplatanus*
15. *A.platanoides*
16. *A.campestre*
17. *A.monspessulanum*
18. *A.tataricum*
19. *Ulmus glabra*
20. *U. montana*
21. *U. minor*
22. *U. procera*
23. *Fraxinus excelsior*
24. *F.ornus*
25. *Carpinus betulus*
26. *Cerasus avium*
27. *Tilia cordata*
28. *T.platyphylos*
29. *T. tomentosa*
30. *Betula*
31. *Alnus glutinosa*
32. *A.viridis*

33. *A.incana*
34. *Sorbus acuparia*
35. *Salix sp.*

Table 2 Romanian forests and the main species (1994)[1]

No. Species	Area(ha)	%
Total forestry fund	**6,341,472**	
Total forest area	**6,223,416**	**100.0**
I *Picea abies*	1,431,670	23.0
2. *Abies alba*	311,452	5.0
3. *Larix decidua*	22,050	0,35
4. *Pseudotsuga menziesii* [1]	12,584	0,20
5. *Pinus sp.*	129,534	2.10
6. Other coniferous	3,476	0.05
Total coniferous,	**1,910,766**	**30.70**
7. *Fagus sylvatica*	1,909,187	30.70
8. *Quercus petraea*	670,319	10.80
9. *Q. robur*	139,856	2.25
10. *Quercus sp.*	332,325	5.34
11. *Robinia pseudoacacia* [1]	252,673	4.06
12. *Acer sp* .	44,636	0.71
13. *Fraxinus sp.*	56,872	0.91
14. *Cerasus avium*	7,922	0.01
15. *Juglans nigra* [1]	6,350	0.01
16. Other hard woody species	58,132	9.34
Total hard woody species	**4,001,466**	**64.07**
17. *Tilia sp.*	100,626	1.61
18. *Salix sp.*	44,420	0,71
19. *Populus sp.*including *P.nigra*	115946	1.86
20. Other soft woody species	192	0.80
Total soft broad-leaved sp.	**311,184**	**4.98**
Total broad-leaved	**4,312,650**	**69.30**
Total coniferous + broad-leaves sp.	**6,223,416**	**100.0**
Un-afforested areas	**118056**	
Total forestry fund	**6341472**	

1) Non-indigenous species

Table 3 National parks[1]) with the main natural forest genetics resources

No	Location	Area (ha)
I.	Retezat (Rezervatia Biosferei - Parcul National)	54,400.00
2.	Rodna (Rezervatia Biosferei - Parcul National)	56,700.00
3.	Domoglet - Valea Cernei (Parcul National)	60,100.00
4.	Cheile Nerei - Beusnita (Parcul National)	45,561.00
5.	Apuseni (Parcul National)	37,900.00
6.	Bucegi (Parcul National)	35,700.00
7.	Semenic - Cheile Carasului (Parcul National)	30,400.00
8.	Ceahlau - (Parcul National)	17,200.00
9.	Cozia (Parcul National)	17,100.00
10.	Calimani (Parcul National)	15,300.00
11.	Piatra Craiului (Parcul National)	14,800.00
12.	Cheile Bicazului (Parcul National)	11,600.00
13.	Gradistea de Munte - Cioclovina (Parc natural)	1,000.00
	Total[2])	**397,761.00**

1) According to: Ocrotirea Natuii si Mediului Inconjurator 36,1:22-33, Bucuresti,1992;
2) 145,000 ha out of 397,761 ha represents forest genetics resources for the main indigenous species.

Table 4 List of the natural forest reserves

No.	Forest	District	Location	Area (ha)	IUCN (category)
1.	Padurea Runc	BC	Racova	57.5	IV
2.	Padurea Izvorul alb	BC	Darmanesti	3.0	IV
3.	Ipotesti	BT	Gorbanesti	1,014.8	V
4.	Padurea Dognecea	CS	Dognecea	316.5	IV
5.	Padurea Berzovia	CS	Berzovia	253.8	IV
6.	Padurea Chitu - Bratcu	GJ	Bumbesti	1,319.0	IV
7.	Padurea Cornisel	GJ	Bumbesti	85.0	IV
8.	Padurea Tismana - Pocruia	GJ	Tismana	51.6	IV
9.	Padurea Gorganu	GJ	Pades	21.3	IV
10.	Padurea Polovragi	GJ	Polovragi	10.0	IV
11.	Padurea Girboavele	GL	Galati	100.0	IV
12.	Magurile Sacarimbului	HD	Sacarimb	500.0	IV
13.	Padurea Chizid	HD	Hunedoara	129.0	IV
14.	Padurea Beian	HD	Deva	103.0	IV
15.	Padurea Homosu	IS	Deleni	73.3	IV
16.	Padurea Uricani	IS	Miroslova	68.0	IV
17.	Padurea Roscani	IS	Trifesti	34.6	IV
18.	Padurea Poieni	IS	Schitu Duca	9.2	IV
19.	Padurea Catalina	IS	Cotnari	7.6	IV
20.	Lunca Banului	MH	Lunca Banului	387.0	IV
21.	Padurea Punghina	MH	Punghina	189.0	IV
22.	Padurea Borovat	MH	Balvanesti	30.0	IV
23.	Padurea Bunget	MH	Burila Mare	18.2	IV
24.	Padurea Ronisoara	MM	Rona de sus	62.0	IV
25.	Padurea Ocna Sugatag	MM	Ocna Sugatag	44.0	IV
26.	Padurea Bavna	MM	Miresu Mare - Fersig	26.0	
27.	Padurea Costiui	MM	Rona de sus	0.7	IV
28.	Padurea Mociar	MS	Solovastru	48.0	IV
29.	Padurea Gosmanu	NT	Tarca	175.0	IV
30.	Padurea Vinatori	NT	Vinatori - Neamt	70.6	IV

List of the natural forest reserves (continued)

No.	Forest	District	Location	Area (ha)	IUCN (category)
31.	Padurea de Arama	NT	Agapia	20.0	
32.	Padurea de Argint	NT	Agapia	0.5	
33.	Padurea Urziceni	SM	Urziceni	38.2	IV
34.	Padurea Foieni	SM	Foieni	8.0	IV
35.	Padurea Crujana	SV	Patrauti	32.3	IV
36.	Padurea Baros(Parc)	TM	Remetea mare	60.0	IV
37.	Padurea Tisa Mare	VL	Lungesti	50.0	IV
38.	Padurea Silea	VL	Fumueni	25.0	IV
39.	Padurea Verdele	VN	Naruja	250.0	IV
40.	Padurea Cenaru I	VN	Andreiasu	233.4	IV
41.	Padurea Lepsea - Zboina	VN	Tulnici	210.7	IV
42.	Padurea Schitu - Dalhauti	VN	Cirligele	188.2	IV
43.	Padurea Cenanu II	VN	Andreiasu	149.8	IV
44.	Padurea Izvoarele - Narujei	VN	Nistoresti	78.0	IV
45.	Padurea Badeana	VS	Tutova	126.7	IV
46.	Padurea Hirboanca	VS	Delesti	69.5	IV
47.	Padurea Seaca - Movileni	VS	Coroiesti	48.1	IV
48.	Padurea Balteni	VS	Stefan cel Mare	22.0	IV
	Total			**6818.1**	

1) According to: Ocrotirea Naturii si Mediului Inconjurator 36,1:22-33, Bucuresti,1992;

Table 5 Seed stands

No.of stands	Species	Total area (ha)	Natural area "in situ" (ha)	Planted area "ex situ" (ha)
557	*Picea abies*	16887.9	14168.1	2719.8
371	*Abies alba*	10830.1	10728.2	101.9
121	*Larix decidua*	966.4	540.4	426.0
318	*Pinus sylvestris*	3403.2	846.7	2556.5
142	*P. nigra*	663.2		663.2
1	*P.nigra var.Banatica*	21.7		21.7
16	*P.strobus*	26.2		26.3
3	P. *cembra*	3.1	3.1	
18	*P. menziesii var. viridis*	64.5		64.5
1	*P.menziesii var.caesia*	4.5		4.5
7	*Taxodium distichum*	15.2		15.2
1,555	**Total coniferous**	**32886.0**	**26286.5**	**6599.5**
			(80%)	**(20%)**
214	*Fagus silvatica*	8121.2	8121.2	
498	*Quercus petraea*	17409.4	17056.8	352.6
211	*Quercus robur*	5194.5	4658.8	535.7
69	*Q. cerris*	711.8	705.1	6.7
46	*Q. frainetto*	1851.9	1851.9	
41	*Q.pedunculiflora*	870.4	785.3	85.1
6	*Q. pubescens*	19.8	19.8	
14	*Q. boreal is*	44.8		44.8
7	*Q.palustris*	54.5		54.5
31	*Tilia cordata*	396.1	396.1	
13	T.*platyphylos*	171.4	171.4	
47	*T.tomentosa*	708.7	708.7	
69	*Fraxinus excelsior*	820.4	793.2	27.2
9	*Alnus glutinosa*	74.9	54.0	20.9
28	*Castanea sativa*	197.2	52.7	144.5
5	*Populus alba*	32.0	22.0	10.0
40	*Robinia pseudoacacia*	598.8		598.8
9	*Juglans nigra*	14.8		14.8
1,357	**Total broad-leaved**	**37292.6**	**35397.0**	**1895.6**
			(95%)	**(5%)**
2,912	**Coniferous + broad-leaved**	**70178.6**	**61683.5**	**8495.1**
			(88%)	**(12%)**

Table 6 Seed orchard

Species	Area (ha)	Fructification +)
Picea abies	105.0	+
Abies alba	95.8	+
Larix decidua	148.0	+
Pseudotsuga menziesii var.viridis 1)	52.9	+
Pinus nigra	76.3	+
Pinus sylvestris	83.4	+
Pinus strobus 1)	31.4	+
Pinus cembra	5.0	+
Total coniferous	**597.8**	
Acer pseudoplatanus	7.0	+
Robinia pseudoacacia 1)	126.7	+
Tilia sp.	32.3	
Fraxinus excelsior	49.9	+
Quercus sp.	87.0	+
Cerasus avium	67.1	+
Castanea sativa 1)	5.0	
Total broad-leaved sp.	**375.0**	
Total resinous + broad-leaved sp.	**972.8**	

+) These species are seed producing
1) Non-indigenous species

Table 7 Provenance trials

Species	Trials no.	No. of provenence			Total area (ha)
		Total	Non indigenous	Indigenous	
Picea abies	17	124	76	48	39.4
Abies alba	9	60	26	34	18.0
Pinus nigra	5	100	100		7.50
P.menziesii - viridis	5	49	49		7.11
Larix decidua	7	55	36	19	3.99
Quercus petraea	3	32		32	4.50
Q.robur	8	26	2	24	7.70
Fraxinus excelsior	5	22	5	17	4.80
P.silvestris	8	36		36	6.00
Total	**67**	**504**	**294**	**210**	**98.54**

Table 8 Half - sib progeny trials

Combination	Location	Families	Area (ha)
Pinus strobus x P.peuce	Cosava - Costeiu	40	0.7
Pinus strobus x P.peuce	Caransebes - Valisor	28	1.0
Pinus strobus x P.peuce	Bampotoc	25	0.8
Pinus strobus x P.peuce	Padurea verde	48	0.2
Pinus peuce x P.strobus	Valiug	12	0.2
Pinus peuce x P.strobus	Bampotoc	9	0.3
Pinus peuce x P.strobus	Padurea verde	19	0.1
Pinus strobus x P.griffithii	Valiug	14	0.8
Pinus strobus x P.griffithii	Bampotoc	16	0.5
Pinus strobus x P.griffithii	Padurea verde	47	0.2
Pinus strobus x P.griffithii	Cosava - Costei	36	0.6
Various hybrids		49	6.9

Table 9 Full-sib interspecific hybrid trials

Combination	Location	Families	Area (ha)
Pinus strobus x P.peuce	Cosava - Costeiu	40	0.7
Pinus strobus x P.peuce	Caransebes - Valisor	28	1.0
Pinus strobus x P.peuce	Bampotoc	25	0.8
Pinus strobus x P.peuce	Padurea verde	48	0.2
Pinus peuce x P.strobus	Valiug	12	0.2
Pinus peuce x P.strobus	Bampotoc	9	0.3
Pinus peuce x P.strobus	Padurea verde	19	0.1
Pinus strobus x P.griffithii	Valiug	14	0.8
Pinus strobus x P.griffithii	Bampotoc	16	0.5
Pinus strobus x P.griffithii	Padurea verde	47	0.2
Pinus strobus x P.griffithii	Cosava - Costei	36	0.6
Various hybrids		49	6.9

Table 10 Clonal trials

Specia	Location	Clones	Area (ha)
Larix decidua	Sinaia-Toplit	102	0.7
Picea species "Pendula"	Racoasa-Soveja	125	2.8
Various species of *Picea*	Mihaiesti	25	0.5
Picea abies	Hemeius	20	3.0
Larix decidua	Simeria-Bejan	121	2.0
Larix leptolepis	Simeria-Bejan	10	0.3
Pinus cembra	Cosava-Costei	50	0.6
Pinus cembra	Busteni-Polanca	20	2.0
Pinus peuce	Sinaia	20	1.1
Pinus peuce	Cosava-Costei	20	0.9
Breeding arboretum	Sacele	267	7.0
Total		**780**	**21.0**

Table 11 "Populus sp. And Salix sp.resources established by "Populus and Salix Experimental Station"

Species or group of species	Stands or location	Total area (Ha)
1. Natural stands *"in situ"* conserved (total)	**22**	**111.0**
1.1. *Pinus alba* and *P. Canescens*	10	37.0
1.2. P. Nigra	2	10.0
1.3. P. tremula	10	64.0
2. Experimental plantations *"ex situ"*conserved (Total)	**161**	**742.0**
2.1. *Populus sp.* (Euro-Americana, Deltoides, Alba and hybrids)	134	656.0
2.2. *Salix alba* and hybrids (such *as S.alba x S.alba;S.alba x S.fragilis)*	27	86.0
3. Plantations of "mother plant" for scion collection *"ex situ"* conserved (total)	**55**	**46.0**
3.1. *Populas sp.* (13 species)	39	31.6
3.2. *Salix* (8 species and 4 hybrids such as *S.alba x S.alba; S.alba x S.fragilis; S.fragilis* x *S.matsudana; S.matsudana* x *S.fragilis)*	16	14.4

APPENDIX

FIELD USE CATEGORIES (THOUSAND HECTARS)

Production	Year		
	1 989	1 991	1 994
Farming area:			
from this area	**15 094.1**	**14 765.7**	**14 793.1**
a arable area that consists of	10 080.4	9 450.4	9 341.5
1 cereals for grain	6 027.1	5 923.3	5 977.6
2 leguminous plants	311.3	187.6	198.8
3 technical plants	1 548.9	908.0	1 204.4
4 potato	351.4	289.6	310.4
5 vegetables	252.8	216.0	231.4
b pasture	3 003.7	3 262.5	3 362.6
c haylands	1 403.5	1 465.3	1 489.3
d orchards and fruit tree nursery	336.2	313.4	295.8
e wineyard and wine nursery	270.3	277.4	303.9
Forest area and other forest vegetation field	**6 567.0**	**6 685.4**	**6 367.0**
Rivers and pools	840.8	903.6	840.8
Total area	**23 750.0**	**23 839.0**	**23 750.0**

WILD SPECIES RELATED TO CULTIVARS

Scientific name	Spreading (areal)	Growing type soil	Utilisation feature
A. Agricultural plants			
Aegilops cylindrica	plain, steppe	low acid, eubasic	-
Avena barbata	field	-	-
Avena fatua	plain, montane	eubasic, low humic soil	-
Avena sterilis	plain, montane	eubasic	-
Hordeum bulbosum	grassland, field	-	-
Hordeum murinum	plain, stepe	salt soil	-
Hordeum murinum	plain, stepe	low humic soil	-
Hordeum nodosum	grassland	low salt soil	-
Secale montanum	montane	calcic soil	-
Secale silvestre	stepe, sylvosteppe	eubasic,low humic soil	-
Pisum elatius	field	-	-
Beta trygina	plain, stepe	-	-
Brassica juncea	plain	-	-
Brassica nigra	plain, steppe	mesobasic	forage,med.
Solanum dulcamara	plain, montane	eubasic, rich in humus	toxic
Solanum luteum	plain	-	-
Solanum nigrum	steppe	eubasic	toxic
Solanum retroflexum	plain	sand	-
Solanum triflorum	plain	sand	-
Carthasmus lanatus	plain	calcic soil	-
Linum austriacum	plain	eubasic	-
Linum catharticum	montane	eubasic	-
Linum flavum	plain, sylvosteppe	eubasic, low acid	-
Linum hirsutum	plain, steppe	eubasic, low acid	-
Linum nervosum	plain, steppe	eubasic, low acid	-
Linum tryginum	hill	eubasic	-
Allium angulosum	sylvosteppe	eubasic	-
Allium atropurpureum	plain, sylvosteppe	clay or loess	-
Allium flavum	plain	calcic soil	-
Allium guttatum	steppe	calcic soil	-
Allium montanum	montane	calcic soil	-
Allium ochroleucum	montane	-	-
Allium paniculatum	plain, steppe	sand, loess	-
Allium ursinum	plain, montane	eubasic	food
Allium vineale	plain	salt soil	-
Daucus carota spp. carota	plain, montane	eubasic	-
Daucus guttatus ssp. zahariadii	steppe, sylvosteppe	-	-
Fragaria vesca	hill, alpine	mesobasic, eubasic	food, med
Fragaria viridis	plain	mesobasic	food
Ribes alpinum	montane,subalpine	eubasic, low acid	-
Ribes petraeum	montane,subalpine	eubasic	-
Ribes spicatum	montane	-	-
Rosa agrestis	hill, montane	eubasic	-
Rosa arvensis	hill, montane	low in limestone	food
Rosa caesia	hill, montane	-	-
Rosa canina	plain, montane	eubasic	food, med

WILD SPECIES RELATED TO CULTIVARS (continued)

Scientific name	Spreading (areal)	Growing type soil	Utilisation feature
Rosa tomentosa	hill	-	-
Corylus colurna	hill, montane	calcic soil	food
Malus sylvestris	montane,sylvosteppe	-	ind.
Prunus cerasifera	plain, montane	-	food
Prunus fructicosa	plain, steppe	calcic soil	-
Prunus padus	hill, montane	eubasic	ind.
Prunus spinosa	hill, steppe	eubasic, low acid	food, ind.
Rubus caesus	hill, montane	eubasic, low acid	food
Rubus canescens	montane,sylvosteppe	eubasic, low acid	-
Rubus fruticosus	montane,sylvosteppe	forest soil	food, ind.
Rubus hirtus	montane	mesobasic	-
Rubus macrostachys	montane	mesobasic	-
Rubus rhombifolius	hill	-	-
Rubus silvaticus	hill	-	-
Pyrus elaeagrifolia	steppe	-	-
Pyrus nivalis	steppe	-	-
Pyrus pyraster	plain	eubasic	ind.
Vitis sylvestris	hill	drif soil	-
B. Pastoral plants			
Bromus arvensis	steppe, plain	eubasic, low acid	-
Bromus erectus	montane,sylvosteppe	eubasic, low acid	forage
Bromus inermis	plain	eubasic	forage
Bromus mollis	montane, steppe	-	-
Bromus ramosus	montane, plain	eubasic, low acid	-
Bromus riparius	steppe, subalpine	eubasic, low acid	-
Bromus secalinus	montane,sylvosteppe	eubasic, low acid	-
Bromus sterilis	montane, steppe	eubasic, loess	-
Dactylis glomerata	steppe, subalpine	eubasic, mesobasic	forage
Dactylis polygama	hill, montane	eubasic	forage
Festuca alpestris	subalpine	-	-
Festuca arundinacea	plain, montane	low humic soil	forage
Festuca bucegiensis	alpine	oligo basic	-
Festuca gigantea	wood, montane	eubasic	forage
Festuca ovina	hill, alpine	oligo basic	forage
Festuca porcii	montane, subalpine	eubasic	-
Festuca heteropylla	hill	mesobasic	turf
Festuca pratensis	plain, montane	eubasic, low acid	forage
Festuca rubra	hill	oligo eubasic	forage
Festuca tenuifolia	hill, montane	oligobasic, acid	-
Festuca vaginata	hill	-	-
Festuca valesiaca	plain, montane	eubasic	forage
Lolium multiflorum	hill	-	forage
Lolium perenne	plain, montane	mesobasic, eubasic	turf, forage
Lolium remotum	montane, hill	-	toxic
Lolium temulentum	plain	eubasic	toxic
Phleum alpinum ssp. commutatum	montane, alpine	eubasic	forage
Phleum montanum	hill, montane	eubasic	forage
Phleum phleoides	plain, montane	acid-neutral, low humic soil	forage
Phleum pratense	plain, montane	eubasic, acid-neutral	forage

WILD SPECIES RELATED TO CULTIVARS (continued)

Scientific name	Spreading (areal)	Growing type soil	Utilisation feature
Lathyrus aphaca	hill, steppe	mesobasic, loess	-
Latyrus aureus	plain	-	-
lathyrus hirsutus	hill	-	-
Lathyrus latifolius	plain, montane	eubasic, low acid	-
Lathyrus niger	montane,sylvosteppe	eubasic, low humic soil	-
Lathyrus pratensis	montane, plain	moderated, acid	-
Lathyrus sylvestris	montane, plain	eubasic, low acid	-
Lathyrus transsilvanicus	hill, wood	-	-
Lotus angustissimus	steppe	salt soil	-
Lotus corniculatus	plain, alpine	degraded soil	forage
Lotus tenuis	plain, hill	salt, loamy soil	forage
Lotus uliginosus	plain	hydromorphic humus	-
Medicago arabica	hill, sylvosteppe	-	forage
Medicago falcata	plain, montane	eubasic	-
Medicago lupulina	plain, steppe	mesobasic, eubasic	-
Medicago minima	plain, hill	eubasic, low acid	-
Medicago prostrata	rocky soil	-	-
Medicago sativa	hill	-	forage
Onobrychis alba	grassland rocks	-	-
Onobrychis arenaria	hill	eubasic	forage
Onobrychis gracilis	sylvosteppe	-	-
Onobrychis montana	alpine	skeleton, soil	forage
Onobrychis viciifolia	montane, plain	eubasic, mesobasic	forage
Trifolium arvense	plain, montane	mesobasic	forage
Trifolium alpestre	steppe, alpine	eubasic, low acid	forage
Trifolium aureum	plain, montane	eubasic, acid neutral	-
Trifolium campestre	plain, montane	eubasic, mesobasic	-
Trifolium dubium	plain	moderated acid	-
Trifolium montanum	plain, montane	eubasic	forage
Trifolium ochroleucum	plain,sylvosteppe	eubasic, mesobasic	forage
Trifolium pannonicum	hill, montane	eubasic, mesobasic	-
Trifolium pratense	plain, montane	eubasic, acid neutral	forage
Trifolium repens	plain, alpine	-	forage
Trifolium resupinatum	hill	clay soil	-
Vicia amphycarpa	steppe	eubasic	-
Vicia cracca	steppe	eubasic	forage
Vicia grandiflora	steppe	-	-
Vicia hirsuta	plain, montane	eubasic,mesobasic	-
Vicia lutea	plain, montane	-	-
Vicia pannonica	plain	low acid	forage
Vicia tetrasperma	steppe, plain	mesobasic, oligobasic	-
Vicia villosa	plain	neutral soil	forage
C. Medical plants			
Angelica palustris	hill, montane	turfary	-
Angelica sylvestris	plain, montane	eubasic, mesobasic	med.
Artemisia arenaria	steppe	littoral sand	-
Artemisia austriaca	plain	eubasic	-
Artemisia petrosa	alpine	calcic soil	-

WILD SPECIES RELATED TO CULTIVARS (continued)

Scientific name	Spreading (areal)	Growing type soil	Utilisation feature
Artemisia vulgaris	plain, montane	-	-
Atropa belladonna	hill, montane	eubasic, low acid	med.
Dactylis ferruginea	plain, hill	eubasic, low acid	toxic
Digitalis grandiflora	plain, subalpine	eubasic, mesobasic	toxic
Digitalis lanata	plain, hill	eubasic, low acid	toxic
Draccocephalum austriacum	hill, montane	calcic soil	-
Draccocephalum ruyschiana	montane, subalpine	calcic soil	-
Draccocephalum thymiflorum	montane	-	-
Mentha aquatica	montane, plain	eubasic, mesobasic	-
Mentha arvensis	montane, plain	oligobasic, mesobasic	-
Mentha pulegium	montane, plain	eubasic, mesobasic	med. aromatic
Mentha verticillata	montane, plain	-	-
Mentha villosa	hill	-	-
Matricharia chamomilla	plain, steppe	mesobasic, oligobasic	med.
Matricaria matricarioides	hill, subalpine	compact soil	med.
Papaver argemone	plain, hill	-	-
Papaver dubium	plain	low acid	-
Papaver hybridum	hill	-	-
Papaver rhoeas	plain, hill	eubasic, low acid	med.
Plantago altissima	plain, hill	moderated acid	med.
Plantago lanceolata	steppe	-	med.
Plantago major	steppe, alpine	eubasic, mesobasic	med.
Plantago maxima	plain	-	-
Plantago media	plain, subalpine	eubasic, mesobasic	med.
Salvia aethiops	hill, plain	eubasic, mesobasic	med.
Salvia nemorosa	plain, montane	eubasic, low acid	-
Salvia pratensis	plain, hill	eubasic, low acid	-
Salvia trassilvanica	hill	loamy-clay soil	-
Sambucus ebulus	plain, montane	eubasic	med.
Sambucus nigra	plain, montane	eubasic, mesobasic	med.
Sambucus racemosa	montane	eubasic, mesobasic	-
Trigonella gladiata	plain	skeleton soil	-
Trigonella monspelica	plain, steppe	low acid	-
Trigonella procumbens	steppe, plain	mesobasic, eubasic	-
Valeriana montana	montane	skeleton soil	-
Valeriana sambucifolia	montane, subalpine	skeleton soil	-
Valeriana tripteris	montane, subalpine	skeleton soil	-

med.=medicinal
ind.=industrial

AGRICULTURAL RESEARCH INSTITUTES AND STATIONS INVOLVED

No.crt.	Name	Research type	Center
1.	Research Institute for Cereals and Technical Plants of Fundulea	wheat,maize, barley, sorghum, tritioale, peas, beans, soya-bean, sunflower, luceme, forages, flax, a.s.o.	FUNDULEA
	Agricultural Research Station of Suceava	Wheat, rye, barley, tritioale, maize, potato, fooder, kohlrabi a.s.o.	SUCEAVA
	Agricultural Research Station of Turda	maize,wheat, barley, tritioale, beans, soya-bean	TURDA
	Agricultural Research of Lovrin	maize, hemp, fodder, beet	LOVRIN
	Agricultural Research Station of Podu-Iloaie	wheat, maize, sunflower	PODU-ILOAIE
	Agricultural Research Station of Secuini	hemp	ROMAN
	Agricultural Research Station of Teleorman	castor-oil plant	TELEORMAN
	Agricultural Research Station of Livada	flax	LIVADA
	Agricultural Research Station of Valu lui Traian	maize	VALU LUI TRAIAN
	Research Station for Cereals and Technical Plants of Pitesti	wheat	PITESTI
	Agricultural Research Station of Caracal	barley,peas	CARACAL
2.	Potato Research and Production Institute of Brasov	potato	BRASOV
	Potato Research and Production Station of Mercurea Ciuc	potato	MIERCUREA CIUC
	Potato Research and Production Station of Tg. Secuiesc	potato	TG. SECUIESC
	Potato Research and Production Station of Marsani	potato	MARSANI
	Potato Research and Production Station of Tulcea	potato	TULCEA
3.	Research and Production Institute for sugar-beet and sweet substances of Fundulea	sugar-beet	FUNDULEA
4.	Lawn Crop Research Institute of Brasov	perennial forages	BRASOV
5.	Central Station for Medicinal Herb Researches of Fundulea	fennel,mint, chamomile, sweet basil a.s.o.	FUNDULEA
6.	Vegetable and Flower Gardening Research Institute of Vidra	onion, garlic, cucumber, tomatoes	VIDRA
	Vegetable Gardening Research and Production Station of Ialnita	tomatoes, peas,beans, pepper	IALNITA
	Vegetable Gardening Research and Production Station of Bacau	pepper, cucumbers,beans cauliflower, cabbage	BACAU
	Vegetable Gardening Research and Production Station of Iernut	cabbage, radish	IERNUT
	Commercial Society "Supersem" of Arad	pepper	ARAD
7.	Lawn Crop Research Institute of Brasov	perennial forages	BRASOV
8.	Fruit Growing Research and Production Institute of Maracineni	apple-tree, pear-tree, nut tree, cherry-tree a.s.o.	PITESTI
9.	Wine-growing Research and Production Institute of Valea Calugareasca		VALEA CALUGAREASCA

THE COMPOSITION OF PLANT GERMPLASM COLLECTIONS (INDIGENOUS CULTIVARS) HELD BY THE ROMANIAN RESEARCH STATIONS AND INSTITUTES, IN JANUARY 1995

Species	Total no of accessions	INDIGENOUS CULTIVARS							
		wilds	land races	breeds	hybrids	lines	mutantes	synthetic	other forms
Triticum sp.	8,552	-	26	148	5	215	68	-	-
Hordeum sp.	3,212	-	-	26	-	132	10	-	-
Secale sp.	374	4	5	3	27	85	-	-	4
Avena sp.	666	-	-	3	-	41	-	-	-
Triticale	756	-	-	13	-	236	-	-	-
Zea mays	8,051	-	738	26	1,475	2,590	80	77	-
Panicum sp.	274	-	10	5	-	29	-	-	-
Sorghum sp.	72	-	-	2	-	30	-	-	-
Phaseolus vulgaris	1,813	-	383	26	49	263	55	-	-
Pisum sativum	863	-	-	35	30	-	-	-	-
Glicine max.	2,389	-	-	15	-	278	27	-	-
Vicia faba	889	-	130	2	-	414	161	-	-
Helianthus annuus	2,540	42	161	4	76	1,652	40	304	30
Solanum tuberosum	30,796	-	-	24	-	27	10	-	30,000
Beta sp.	20,309	-	-	41	909	7,995	-	45	1,254
Linum sp.	2,601	-	33	18	-	429	5	-	-
Cannabis sp.	171	13	3	7	14	42	-	-	60
Forages	4,211	1,169	56	77	700	490	-	96	155
Brassica napus Br.campestris	122	-	1	2	-	20	11	-	-
Capsicum annuum	765	-	-	23	56	624	-	-	-
Brassica oleracea	361	-	-	6	-	203	-	2	-
Lycopersicum	1,189	-	-	24	11	682	7	-	-
Allium cepa	15	-	11	1	-	-	-	-	-
Raphanus sp.	3	-	1	1	-	1	-	-	-
Pastinaca sp.	1	-	-	1	-	-	-	-	-
Lactuca sativa	80	-	-	2	-	8	-	-	-
Cucumis melo	114	-	10	3	-	14	-	-	-
Medicinal and aromatic plants	30	6	101	15	-	-	-	-	41
Dahlia variabilis	30	-	19	-	-	9	-	-	-
Callistephus chinensis	25	-	11	2	-	10	-	-	-
Vitis sp.	1,000	1	48	52	-	-	2	-	-

THE COMPOSITION OF PLANT GERMPLASM COLLECTIONS (INTRODUCED CULTIVARS) HELD BY THE ROMANIAN RESEARCH STATIONS AND INSTITUTES, IN JANUARY 1995 (continued)

Species	Total no of accessions	INTRODUCED CULTIVARS							
		wilds	old cultivars	breeds	hybrids	lines	mutantes	synthetic	other form
Triticum sp.	8,552	29	199	5,613	79	2,153	-	17	-
Hordeum sp.	3,212	1	172	2,593	-	217	21	-	40
Secale sp.	374	-	-	180	-	40	-	30	-
Avena sp.	666	-	-	525	-	97	-	-	-
Triticale	756	-	-	84	-	423	-	-	-
Zea mays	8,051	-	16	4	40	2,781	35	50	138
Panicum sp.	274	-	130	100	-	-	-	-	-
Sorghum sp.	72	-	-	20	-	20	-	-	-
Phaseolus vulgaris	1,813	26	123	574	-	314	-	-	-
Pisum sativum	863	30	-	684	-	84	-	-	-
Glicine max.	2,389	2	310	1,477	-	275	5	-	-
Vicia faba	889	-	-	130	-	52	-	-	-
Helianthus annuus	2,540	25	35	13	13	120	8	15	2
Solanum tuberosum	30,796	29	-	600	-	106	-	-	-
Beta sp.	20,309	12	-	10	28	15	-	-	-
Linum sp.	2,601	48	57	1,789	-	221	-	-	-
Cannabis sp.	171	-	1	18	1	7	-	-	-
Forages	4211	679	30	438	-	-	-	-	321
Brassica napus Br.campestris	122	-	-	99	-	-	-	-	-
Capsicum annuum	765	-	-	37	14	-	-	-	-
Brassica oleracea	361	-	-	87	63	-	-	-	-
Lycopersicum	1,189	-	-	346	28	65	26	-	-
Allium cepa	15	-	-	3	-	-	-	-	-
Raphanus sp.	3	-	-	-	-	-	-	-	-
Pastinaca sp.	1	-	-	-	-	-	-	-	-
Lactuca sativa	80	-	-	70	-	-	-	-	-
Cucumis melo	114	-	-	74	13	-	-	-	-
Medicinal and aromatic plants	605	40	317	80	-	-	-	-	5
Dahlia variabilis	30	-	2	-	-	-	-	-	-
Callistephus chinensis	25	-	2	-	-	-	-	-	-
Vitis sp.	1,000	5	826	60	-	6	-	-	-

THE COMPOSITION OF GERMPLASM COLLECTION (indigeneous cultivars) HELD AT SUCEAVA-GENEBANK, IN JANUARY 1995

Species	Total no of accessions	INDIGENOUS CULTIVARS					
		wilds	land races	breeds	hybrids	lines	other forms
Zea mays	3,188	-	2,812	-	111	169	-
Triticum sp.	587	-	162	9	-	63	243
hordeum sp	569	-	29	6	-	119	54
Secale cereale	47	-	37	-	-	-	8
Avena sativa	43	-	37	-	-	-	3
Triticale	158	-	-	-	-	-	59
Phaseolus sp.	2,035	-	1,615	32	-	224	-
Vicia faba	540	-	311	-	-	-	-
Pisum sp.	65	-	59	-	-	-	-
Vigna sp.	40	-	20	-	-	20	-
Lens sp.	22	-	5	2	-	-	5
Linum sp.	520	-	25	4	-	19	8
Gossypium sp.	192	-	-	-	-	-	-
Cannabis sp.	64	18	18	5	4	14	-
Carthamus sp.	14	-	6	1	-	-	-
Fagopyrum sp.	12	-	10	1	-	-	1
Solanum sp.	509	-	509	-	-	-	-
Amaranthus sp.	104	-	23	-	-	-	-
Beta	24	-	18	6	-	-	-
Cucurbita sp.	83	-	73	-	-	-	-
Forages	439	188	18	24	-	110	-
Medicinal and aromatic plants	156	5	44	24	-	16	33

THE COMPOSITION OF GERMPLASM COLLECTION (indigeneous cultivars) HELD AT SUCEAVA-GENEBANK, IN JANUARY 1995 (continued)

Species	Total no of accessions	INTRODUCED CULTIVARS					
		wilds	land races	breeds	hybrids	lines	other forms
Zea mays	3,188	-	87	-	9	-	-
Triticum sp.	587	-	39	28	43	-	-
hordeum sp	569	-	359	2	-	-	-
Secale cereale	47	-	-	21	-	-	-
Avena sativa	43	-	-	3	-	-	-
Triticale	158	-	-	-	-	-	99
Phaseolus sp.	2,035	-	62	37	65	-	-
Vicia faba	540	73	90	65	-	1	-
Pisum sp.	65	-	-	-	6	-	-
Vigna sp.	40	-	-	-	-	-	-
Lens sp.	22	-	7	3	-	-	-
Linum sp.	520	-	12	381	30	-	-
Gossypium sp.	192	-	-	-	-	-	-
Cannabis sp.	64	-	-	-	-	-	-
Carthamus sp.	14	-	1	3	3	-	-
Fagopyrum sp.	12	-	-	-	-	-	-
Solanum sp.	509	-	-	-	-	-	-
Amaranthus sp.	104	-	45	-	4	-	-
Beta	24	-	-	-	-	-	-
Cucurbita sp.	83	-	-	9	-	-	-
Forages	439	5	11	1	82	-	-
Medicinal and aromatic plants	156	-	13	15	-	-	-

THE COMPOSITION OF FRUIT STRAWBERRY AND FRUIT BUSHES

SPECIES	No of accessions	Indigenous cultivars		Introduced cultivars		
		landraces	breeds	wilds	old cultivars	breeds
Apple	859	61	24	22	70	702
Pear	565	205	16	28	55	261
Qince	51	35	3	2	5	6
Plump	641	198	23	40	70	310
Sweet cherry	527	130	21	9	42	325
Sour cherry	177	56	16	1	30	74
Apricot	660	148	17	1	75	419
Peach	1,125	87	13	2	103	920
Almond	177	46	1	9	41	80
Walnut	79	49	18	3	2	7
Hazelnut	42	11	3	6	4	18
Chestnut	38	9	6	3	4	16
Strawberry	198	70	2	5	10	111
Currant	198	30	5	9	24	130
Gooseberry	28	3	3	3	2	17
Raspberry	95	18	-	3	8	66
Blueberry	38	7	-	5	2	24
Blackberry	27	2	-	1	-	24
Seabuckthorn	25	23	1	1	-	-
Cornel	59	59	-	-	-	-
Eglantine	25	19	1	5	-	-

LIST OF INDIGENOUS CULTIVARS WHICH WILL BE USED IN AGRICULTURE DURING 1995

No.	Cultivars		Reg.year
1.	**CEREALS**		
	Wheat	Aniversar	1986
		Ariesan	1985
		Flamura 85	1989
		Delia	1993
		Dropia	1986
		Albota	1994
		Alex	1992
		Apullum	1992
		Fundulea 4	1987
		Gabriela	1992
		Lovrin 41	1987
		Rapid	1992
		Speranta	1987
		Simnic	1987
		Trivale	1991
	Rye	Ergo	1988
		Orizont	1988
	Barley	Aura	1992
		Dana	1993
		Madalin	1994
		Laura	1992
		Turdeana	1988
		Adi	1993
		Andra	1994
		Precoce	1986
		Prima	1988
	Rice	Bega	1978
		Chirnogi	1989
		Oltenita	1991
		Speranta	1994

LIST OF INDIGENOUS CULTIVARS WHICH WILL BE USED IN AGRICULTURE DURING 1995 (continued)

No.	Cultivars		Reg.year
1.	**CEREALS**		
	Maize	Bucovina (HT)	1994
		Doina(HT)	1994
		Montana (HT)	1994
		Ciclon (HD)	1991
		Cristal (HT)	1991
		Suceava 99(HT)	1985
		Turda 160(HS)	1990
		Montana (HT)	1992
		Podu-Iloaie (HT)	1990
		Roxana (HS)	1993
		Simona (HS)	1992
		Suceava 97(HT)	1989
		Bucium (HS)	1992
		Elan (HT)	1992
		Andreea (HS)	1992
		Oana(HS)	1993
		Saturn (HS)	1994
		Turda 260(HS)	1990
		Fundulea 322(HS)	1990
		Olt (HS)	1994
		Opal (HS)	1994
		Ovidiu (HS)	1994
		Progres (HS)	1993
		Vultur (HS)	1991
		Octavian (HS)	1993
		Orizont (HS)	1994
		Rival (HS)	1992
2.	**GRAIN LEGUMES**		
	Peas	Marina	1990
		Corina	1991
		Dora	1989
		Rodil	1994
		Vedea	1991
	Beans	Ami	1987
		Emiliana	1989
		Star	1989
	Soya	Ilfov	1989
	bean	Diamant	1987
		Victoria	1990
		Perla	1994
		Atlas	1986
		Stil	1988

LIST OF INDIGENOUS CULTIVARS WHICH WILL BE USED IN AGRICULTURE DURING 1995 (continued)

No.	Cultivars		Reg.year
3.	**OILSEED**		
	Sunflower	Decor	1991
		Domino	1991
		Favorit	1992
		Florom 350	1989
		Turbo	1990
	Flax	Adin	1988
		Gentiana	1993
		Geria	1991
		Iulia	1994
		Raluca	1993
4.	**ROAT AND TUBER PLANTS**		
	Potato	Catellyna	1994
		Sucevita	1994
		Roclas	1994
		Ago	1994
		Bran	1992
		Cibin	1992
		Rene	1992
		Teo	1994
		Corona	1988
		Titus	1993
	Sugar-beet	Andra	1994
		Barsa	1988
		Nero 1	1988
5.	**PERENNIAL LEGUMINOSAE**		
	Clover	Napoca tetra	1991
		Dacia	1990
		Miorita	1990
6.	**PERENNIAL GRAMINEAES**		
		Prennial gramineaes	1989
		Rapid	1988
		Rapsod	1989
		Marta	1990
		Mara	
	Fescue	Poiana	1988
		Ferma	1989
		Pastoral	1990
		Pandur	1990
		Parnas	1991
		Brio	1990

LIST OF INDIGENOUS CULTIVARS WHICH WILL BE USED IN AGRICULTURE DURING 1995 (continued)

No.	Cultivars		Reg.year
7.	**MEDICINAL AND AROMATIC PLANTS**		
	Digitalis *spp*	Lanata 1	1992
		Magurele	1990
	Poppy	Extaz	1986
		De Botosani	1985
		De Calarasi	1985
		Mostistea	1980
8.	**VEGETABLES**		
	Cabbage	Magura	1993
		De Buzau	1952
		de Vidra	1980
		Mocira	1991
	Onion	Diamant	1979
		de Buzau	1971
		de Aries	1952
	Tomatoes	Unirea	1985
		Isalnita 50	1988
		Ferma	1984
		Pavio	1988
		Mara	1988
		Vidra 533	1990
		Dacia	1988
		Romec	1986
	Pepper	Cosmin	1989
		Export	1990
		Titan	1990
		Cornel	1989
		Madalina	1986
		Carmin	1980
		Simultan	1989
	Garding peas	Isalnita	1989
		Cornelia	1990
		Vidra 187	1991
	Eggplants	Dragaica	1991
		Lucia	1992
		Viorica	1985
	Water melon	De Dabuleni	1986
		Dulce de Dabuleni	1989

LIST OF INDIGENOUS CULTIVARS WHICH WILL BE USED IN AGRICULTURE DURING 1995 (continued)

No.	Cultivars		Reg.year
9.	**FRUIT TREE**		
	Pear tree	Timpuriu de Dambovita	1989
		Trivale	1990
		Triumf	1991
		Daciana	1992
		Getica	1990
	Apple tree	Poiana	1989
		Delicios de Voinesti	1973
	Plum tree	Pitestean	1982
		Dambovita	1982
		Vinete romanesti	1994
		Tuleu timpuriu	1990
		Superb	1980
		Albatros	1985
	Cherry tree	Roze amar	1981
		De Maxut	
		Amar galata	1978
	Quince tree	Moldovenes	1978
	Apricot tree	Saturn	1985
		Sulina	1982
	Sour cherry tree	Timpuriu de Pitesti	1971
		Tipuriu de Tg.Jiu	1978
		Mocanesti	1979
		De Botosani	1980
	Nut-tree	Susita	1980
		Novaci	1981
		Victoria	1983
		Roxana	1986
	Chestnuttree	Hobita	1987
		Mara	1988
		Iza	1986

LIST OF INDIGENOUS CULTIVARS WHICH WILL BE USED IN AGRICULTURE DURING 1995 (continued)

No.	Cultivars		Reg.year
9.	**FRUIT TREE**		
	Hazel tree	Cozia	1990
	Black currant tree	Joseni 17	1985
	Sweet briar	Brasov 2	1987
10.	**Vine**		
		Timurie de Cluj	1989
		Cetatuia	1989
		Silvania	1980
		Ozana	1992
		Arcas	1985
		Roz romanesc	1988
		Miorita	1980
		Coarna neagra	1990
		Babeasca gri	1985
		Muscat timpuriu De Bucuresti	1980

NATIONAL BOARD FOR PLANT GENETIC RESOURCES

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Local requirements of the economy are fully satisfied by the woody products.