

FLORISTIC STRUCTURE OF MOUNTAIN PLANTS COLLECTION AND THE PRESENT SITUATION IN BOTANICAL GARDEN OF SIAULIAI UNIVERSITY

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Botanical gardens have good possibilities to make scientific researches and it is important to biodiversity conservation, floriculture, landscape gardening etc. Mountain flora introduction in Botanical garden of Siauliai University began at 2001. The subject of research is to summarize mountain flora introduction process and perspectives. Current collection structure of species and taxonomical dependence was analyzed. In the year 2009 there were 902 plant taxa and cultivars in mountain flora section of Botanical garden. These plant taxa belongs to 249 botanical genus and 53 families. Most numerous families are these: *Asteraceae* Dumort. – 41 genus (16.5 %), *Brassicaceae* Burnett 20 (8.03 %) *Lamiaceae* Lindl. 15 (6.02 %). Most numerous genus in species: *Gentiana* L. 39 (4.3 %), *Saxifraga* L. 26 (2.9 %), *Campanula* L. 25 (2.8 %), *Draba* L. 19 (2.1 %), *Dianthus* L. 18 (2.0 %), *Androsace* L. 16 (1.8 %). 125 plant cultivars (13.9 % of all mountain plants in collection) are included in the list of collection. Collection increases intensively through the seeds exchange with botanical gardens all over the world. On purpose to form collection of high quality there are ordered more and more seeds collected in their natural habitat. In this collection there are representatives from mountains all over the world (Alps, Pyrenees, Caucasus, Altai, Himalaya, Rocky Mountains, New Zeland) and also from arctic zones. The general condition of plants in collection is estimated and the selection of perspective species is made every year. Attention is paid to decorativeness and endurance of the plants (resistance to cold, drought, diseases, pests, moisture resisting), intensity of species propagation (vegetative, by seeds and self-sow). Substantial place of collection is taken by rare and endemic species of mountain flora and medicinal plants.

Key words: Plant introduction, mountain flora, botanical garden

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INTRODUCTION

Presently plant introduction is characterized as a broad ecological and fitogeographical experiment, which explains plant adaptation possibilities, ecological needs, potential habitat boundaries of species. Longitudinal

introductory researches of herbaceous plants, results of research about cultivation of mountain species are discussed in the works of various authors (Aeschmann et al. 2004, Cullen et al. 1997, 2000, 2002, Jermyn 2001, Jermyn 2005, Good & Millward 2007, Nicholls, 2002, Walters et al. 2001, 2003, Sidorovic, Lunina 1992). In Lithuania,

introductory researches of herbaceous plants are prosecuted in botanical gardens, the field floriculture research station (Baliuniene 2008, Nekrosiene 2008). These longitudinal introductory researches allow to evaluate the ability to grow in certain climatic conditions, adaptation and value of herbaceous plant species. Botanical gardens have good possibilities to make scientific researches and it is important to biodiversity conservation, floriculture, landscape gardening etc. *Ex situ* collections are intended to reduce population extinction risk, preserve genetic diversity, and provide propagates for restoration and recovery programs (Guerrant et al. 2004). Mountain flora introduction in Botanical garden of Siauliai University began at 2001.

The subject of research is to summarize mountain flora introduction process and perspectives.

MATERIAL AND METHODS

The research was pursued in the area of mountain plant collection in Siauliai University botanical garden. This area is rearranged in regard to geographical origin of mountain plants. Expositions of European mountains, Himalayas, North American mountains was established. The part of species are additionally grown in the experimental area of Botanical garden. The species, which are more sensitive to environmental conditions are grown in pots and kept in frames. The collection of mountain plants are increasing every year. The dates of sowing, germination of plant seeds are registered. The observation of plants are organized from 2002. The plants of the collection are observed in the spring when they recover and in the season of vegetation. In the time of the latter situation some important facts are registered: the beginning of the season vegetation, the profusion of **flowering**, resistance to cold, pests and diseases, the propagation by seeds and in the vegetative way, self – sow (3 points), the decorative value of the species (5 points).

All the alpine endemic and rare species, growing in our Botanical Garden, are identified using data of Aeschmann (2004). Also East Europe and Siberia rare mountain species are identified according to Nachtadjan (1981). The bioecological characteristics of these unique species are investigated and their decorativeness is estimated by using methods of rare introduced plants research (Sidorovic, Lunina 1992). The information of rare species that is estimated: propagation (by seeds, in vegetative way), resistance to low temperature, the intensity of flowering.

RESULTS AND DISCUSSION

After the inventory in the April 2009 there was defined that in the fund of mountain plants in botanic garden 902 plant taxa and cultivars are stored (Table 1). These plants taxa belongs to 249 botanical genus and 53 families. Most numerous families are these: *Asteraceae* Dumort. – 41 genus (16.5 %), *Brassicaceae* Burnett 20 (8.03 %) *Lamiaceae* Lindl. 15 (6.02 %), *Fabaceae* Lindl. 15 (6,02 %). Most numerous genus in species: *Gentiana* L. 39 (4.3 %), *Saxifraga* L. 26 (2.9 %), *Campanula* L. 25 (2.8 %), *Draba* L. 19 (2.1 %), *Dianthus* L. 18 (2.0 %), *Androsace* L. 16 (1.8 %), subspecies and varieties - 47 units (5,2 %). 125 plant cultivars are included in the list of collection. The main attention is paid to botanic species, therefore hybrids amount only 13.9 % of all the collection. The species of *Sedum* L., *Saxifraga* L., *Sempervivum* L., *Campanula* L., *Dianthus* L. are very numerous as well. This collection is accessioned with new species every year. In the 6 years period the collection increased in 754 taxa (83.6 %, Fig. 1). Annual and biennial plants take 1.7 %, perennial take 98.3 % of all collection. Accordance to life form, 37 (4.1%) plants species attribute to shrubs, 864 (95.9 %) – to herbaceous plants.

The plants of the collection are divided into three phenologic groups accordance to spring sprout process: precocious plants begin to vegetate straight after the snow melting, medial plants

Table 1. The floristic composition of mountain plants collection

Plants families	Division, genus
POLYPODIOPHYTA Cronquist, Takht. et W.Zimm.	
ASPLENIACEAE Newman	<i>Asplenium</i> L. (2).
PINOPHYTA Cronquist, Takht. et W.Zimm. ex Reveal	
CUPRESACEAE Rich. ex Bartl.	<i>Chamaecyparis</i> Spach 3*; <i>Juniperus</i> L. 3*.
MAGNOLIOPHYTA Cronquist, Takht. et W.Zimm. ex Reveal	
AIZOACEAE F.Rudolphi	<i>Delosperma</i> Brown (2) 1*.
ALLIACEAE J. Agardh	<i>Allium</i> L. (5).
APIACEAE Lindl.	<i>Astrantia</i> L. (1); <i>Azorella</i> (1); <i>Endressia</i> (1); <i>Eryngium</i> L. (6); <i>Sphenosciadium</i> (1).
APOCYNACEAE Juss.	<i>Vinca</i> L. (1).
ASPHODELACEAE Juss.	<i>Asphodeline</i> Rchb. (4).
ASTERACEAE Dumort.	<i>Achillea</i> L. (2); <i>Amberboa</i> (Less.) DC. (1); <i>Anacyclus</i> L. (1); <i>Anaphalis</i> DC. (2); <i>Andryala</i> L. (1); <i>Antennaria</i> Gaertn. (6); <i>Anthemis</i> L. (2); <i>Arnica</i> L. (3); <i>Artemisia</i> L. (4); <i>Aster</i> L. (5); <i>Bellium</i> L. (1); <i>Carduncellus</i> Adans. (1); <i>Carlina</i> L. (1); <i>Celmisia</i> Cass. (1); <i>Centaurea</i> L. (1); <i>Cotula</i> L. (3); <i>Craspedia</i> G.Forster (1); <i>Cremanthodium</i> Benth. (1); <i>Dendranthema</i> (DC.) DesMoul (1); <i>Doronicum</i> L. (1); <i>Echinops</i> L. (1); <i>Erigeron</i> L. (3); <i>Eriophyllum</i> Lag. (1); <i>Gnaphalium</i> L. (1); <i>Helichrysum</i> Mill. (3); <i>Hymenoxys</i> Cass. (1); <i>Homogyne</i> Cass. (1); <i>Inula</i> L. (1); <i>Leontodon</i> L. (1); <i>Leontopodium</i> R. Br. ex Cass. (7); <i>Leucanthenopsis</i> (Giroux) Heywood (1); <i>Raoulia</i> (2); <i>Santolina</i> L. (1); <i>Saussurea</i> DC (1); <i>Scorzonera</i> L. (1); <i>Senecio</i> L. (5); <i>Serratula</i> L. (1); <i>Tanacetum</i> L. (1); <i>Tonestus</i> A. Nels (1); <i>Tetraneuris</i> (1); <i>Townsendia</i> J.D.Hooker (6).
ARISTOLOCHIACEAE Juss.	<i>Asarum</i> L. (1).
BERBERIDACEAE Juss.	<i>Epimedium</i> L. (2); <i>Podophyllum</i> L. (2).
BIGNONIACEAE Juss.	<i>Incarvillea</i> Jussieu (3).
BORAGINACEAE Juss.	<i>Arnebia</i> Forsskål (1); <i>Caccinia</i> Savi (1); <i>Eritrichium</i> Schrader (1); <i>Mertensia</i> Roth (2); <i>Moltkia</i> Lehmann (2); <i>Onosma</i> L. (1); <i>Pulmonaria</i> L. (1); <i>Solenanthes</i> Ledeb. (1).
BRASSICACEAE Burnett.	<i>Aethionema</i> R. Brown (4); <i>Alyssoides</i> Miller (1); <i>Alyssum</i> L. (3); <i>Arabis</i> L. (9) 2*; <i>Aubrieta</i> Adanson (1) 2*; <i>Aurinaria</i> Desv. (1); <i>Cochlearia</i> L. (1); <i>Degenia</i> Hayek (1); <i>Draba</i> L. (19); <i>Erysimum</i> L. (1); <i>Hugueninia</i> Rchb. (1); <i>Iberis</i> L. (1) 1*; <i>Megacarpaea</i> DC. (1); <i>Noccaea</i> (1); <i>Petrocallis</i> R. Brow (1); <i>Phoenicautis</i> Nutt. (1); <i>Pritzelago</i> Kuntze (1); <i>Raffenaldia</i> Godr. (1); <i>Thlaspi</i> L. (1); <i>Vella</i> (1).
CAMPANULACEAE Juss.	<i>Asyneuma</i> Griseb. & Schenck (1); <i>Campanula</i> L. (25) 9*; <i>Cyananthus</i> Benth. (2); <i>Codonopsis</i> Wall. (1); <i>Edraianthus</i> DC. (4); <i>Isotoma</i> Lindl. (1); <i>Jasione</i> L. (3); <i>Phyteuma</i> L. (3); <i>Platycodon</i> DC. 1*; <i>Symphandra</i> DC. (3).
CAPRIFOLIACEAE Juss.	<i>Triosteum</i> L. (1).
CARYOPHYLLACEAE Juss.	<i>Arenaria</i> L. (11); <i>Cerastium</i> L. (2); <i>Colobanthus</i> Bartl. (1); <i>Dianthus</i> L. (18) 8*; <i>Gypsophila</i> L. (2); <i>Herniaria</i> (2); <i>Lychnis</i> L. (3) 1*; <i>Mimuartia</i> L. (10); <i>Paronychia</i> Mill. (2); <i>Petrocoptis</i> Braun (1); <i>Petrohagia</i> (Ser.) Link (1); <i>Saponaria</i> L. (6); <i>Silene</i> L. (11).
CISTACEAE Juss.	<i>Fumana</i> (Dunal) Spach (1); <i>Helianthemum</i> Mill. (13) 1*.
CRASSULACEAE DC.	<i>Chiaetophyllum</i> Berger (1); <i>Orostachys</i> Fisch. (3); <i>Rhodiola</i> L. (10); <i>Sedum</i> L. (26) 15*; <i>Sempervivum</i> L. (9) 12*; <i>Umbilicus</i> DC. (1).
CYPERACEAE Juss.	<i>Carex</i> L. (2) 5*.
DIPSACACEAE Juss.	<i>Knautia</i> L. (4); <i>Morina</i> L. (2); <i>Pteroccephalus</i> Adans. (1); <i>Scabiosa</i> L. (2).
EPHEDRACEAE P.F.Yeo	<i>Ephedra</i> L. (3).
EUPHORBIACEAE Juss.	<i>Euphorbia</i> L. (1).
FABACEAE Lindl.	<i>Anthyllis</i> L. (3); <i>Astragalus</i> L. (3); <i>Chesneya</i> (1); <i>Cytisus</i> L. (1); <i>Erinacea</i> Adans. (1); <i>Genista</i> L. (5); <i>Genistella</i> (1); <i>Hedysarum</i> L. (2); <i>Lotus</i> L. (1); <i>Onobrychis</i> Mill. (1); <i>Oxytropis</i> DC. (3); <i>Termopsis</i> R. Br. (1); <i>Tetragonolobus</i> Scop. (1); <i>Tibetia</i> (Ali) H.P., (1); <i>Trifolium</i> L. (1).
FUMARIACEAE DC.	<i>Pseudofumaria</i> (1).
GENTIANACEAE Juss.	<i>Gentiana</i> L. (39) 1*.
GERANIACEAE Juss.	<i>Geranium</i> L. (3).
GESNERIACEAE Dum.	<i>Haberlea</i> Frivaldsky (1); <i>Ramonda</i> Rich. (2).
GLOBULARIACEAE DC.	<i>Globularia</i> L. (7).
HYPERICACEAE Juss.	<i>Hypericum</i> L. (2) 1*.
HYPOXIDACEAE R.Br.	<i>Rhodohypoxis</i> Nel (1).

Table 1. The floristic composition of mountain plants collection (Continuation)

IRIDACEAE Juss.	<i>Crocus</i> L. (2) 2*; <i>Iris</i> L. (7) 1*.
LAMIACEAE Lindl	<i>Acinos</i> Mill. (1); <i>Ajuga</i> L. (1) 3*; <i>Betonica</i> (1); <i>Dracocephalum</i> L. (4); <i>Horminum</i> L. (1) 1*; <i>Marrubium</i> L. (1); <i>Monardella</i> Benth (1); <i>Nepeta</i> L. (2); <i>Origanum</i> L. 2*; <i>Salvia</i> L. (1); <i>Scutellaria</i> L. (3); <i>Sideritis</i> L. (3); <i>Stachys</i> L. (3); <i>Teucrium</i> L. (3); <i>Thymus</i> L. (6) 2*.
LILIACEAE Juss.	<i>Chionodoxa</i> Boiss. (1); <i>Erythronium</i> L. (1); <i>Fritillaria</i> L. (6); <i>Lilium</i> L. (1); <i>Tulipa</i> L. (1); <i>Veratrum</i> L. (1).
LINACEAE DC. ex Gray	<i>Linum</i> L. (4).
ONAGRACEAE Juss.	<i>Epilobium</i> L. (1); <i>Oenothera</i> L. (1).
PAEONIACEAE F.Rudolphi	<i>Paeonia</i> L. (2).
PAPAVERACEAE Juss.	<i>Glaucium</i> Mill. (1); <i>Mecanopsis</i> Vignier (6) 1*; <i>Papaver</i> L. (9).
PLANTAGINACEAE T. Lestib. ex Dumort.	<i>Plantago</i> L. (1).
PLUMBAGINACEAE Juss.	<i>Acantholimon</i> Boiss. (1); <i>Armeria</i> Willd. (11) 2*; <i>Bukiniczia</i> (1); <i>Limonium</i> Mill. (1).
POACEAE (R. Br.) Bernhart	<i>Festuca</i> L. (8); <i>Stipa</i> L. (1).
POLEMONIACEAE Juss.	<i>Linanthus</i> Benth (1); <i>Polemonium</i> L. (1); <i>Phlox</i> L. (3) 9*.
POLYGONACEAE Juss.	<i>Eriogonum</i> Michx. (2); <i>Oxyria</i> Hill. (1); <i>Rheum</i> L. (1); <i>Rumex</i> L. (1).
PORTULACACEAE Juss.	<i>Calandrinia</i> Humb. (5); <i>Lewisia</i> Pursh. (5) 3*.
PRIMULACEAE Vent.	<i>Androsace</i> L. (16); <i>Cortusa</i> L. (2); <i>Dodecatheon</i> L. (1); <i>Douglasia</i> (1); <i>Primula</i> L. (13) 1*; <i>Soldanella</i> L. (2); <i>Vitaliana</i> (1).
RANUNCULACEAE Juss.	<i>Aconitum</i> L. (5); <i>Actea</i> L. (1); <i>Adonis</i> L. (2); <i>Anemone</i> L. (2); <i>Aquilegia</i> L. (13) 1*; <i>Callianthemum</i> Meyer (1); <i>Clematis</i> L. (1); <i>Delphinium</i> L. (3); <i>Eranthis</i> Salisb. (1); <i>Helleborus</i> L. (5); <i>Pulsatilla</i> Mill. (10) 1*; <i>Ranunculus</i> L. (4); <i>Thalictrum</i> L. (2); <i>Trollius</i> L. (4).
ROSACEAE Juss.	<i>Acaena</i> L. (7) 1*; <i>Alchemilla</i> L. (2) 1*; <i>Aruncus</i> L. (1); <i>Dryas</i> L. (3); <i>Geum</i> L. (1); <i>Margyricarpus</i> Ruiz & Pav. (1); <i>Neillia</i> D. Don (1); <i>Potentilla</i> L. (13) 1*; <i>Sibbaldia</i> L. (2); <i>Waldsteinia</i> Willd. (1).
RUBIACEAE Juss.	<i>Asperula</i> L. (3).
RUTACEAE Juss.	<i>Dictamnus</i> L. (1).
SAXIFRAGACEAE Juss.	<i>Astilbe</i> D. Don (1) 1*; <i>Bergenia</i> Moench (3); <i>Heuchera</i> L. (2) 3*; <i>Saxifraga</i> L. (26) 15*; <i>Tolmiea</i> Torr. & Gray (1).
SCROPHULARIACEAE Juss.	<i>Antirrhinum</i> L. (1); <i>Calceolaria</i> L. (3); <i>Chaenorhinum</i> (DC) Rchb. (1); <i>Cymbalaria</i> Hill. (1) 1*; <i>Erinus</i> L. (1); <i>Linaria</i> Mill. (1); <i>Mazus</i> L. (1); <i>Mimulus</i> L. (1); <i>Pedicularis</i> L. (2); <i>Penstemon</i> Schmidel (11); <i>Verbascum</i> L. (5); <i>Veronica</i> L. (10) 3*; <i>Wulfenia</i> Jacq. (2).
THYMELAEACEAE Juss.	<i>Daphne</i> L. (4).
VALERIANACEAE Batsch	<i>Nardostachys</i> (1); <i>Valeriana</i> L. (2); <i>Valerianella</i> Mill. (1).
VIOLACEAE Batsch	<i>Viola</i> L. (4).

() - number of species; * - number of cultivars

begin to vegetate from the middle of april to the end of april, and serotinous plants sprout in the first half of may. Ephemeroids *Eranthis* Salisb., *Fritillaria* L., *Iris danfordiae* (Baker) Boiss. and *Helleborus foetidus* L. vegetate earliest of all the plants. The most of the species begin to vegetate in april, so belong to the second group. The plants of the *Incarvillea* Jussieu, *Acaena* L. genus sprout up latest.

The evaluation data of the species, which grows in the collection more then 5 years are published. The species with high adaptational potential are successfully introduced in various regions (Sidorovic, Lunina 1992), they adapted well in

our garden also. The part of introduced plants successfully naturalized. 24 species raise oneselves in intensive self-sow (*Armeria plantaginea* Willd., *Aurinia saxatilis* (L.) Desv., *Iberis sempervirens* L., *Campanula carpatica* Jacq.). *Waldsteinia ternata* (Stephan) Fritsch., *Minuartia juniperina* (L.) Maire, *Cotula squalida* Hook., *Cymbalaria muralis* P.Gaertn., *Arabis procurrens* Waldst. et Kit., *Campanula cochlearifolia* Lam. intensively propagate by vegetative way.

The resistance to cold is one of the most important factors which determine successful introduction of the species in particular region.

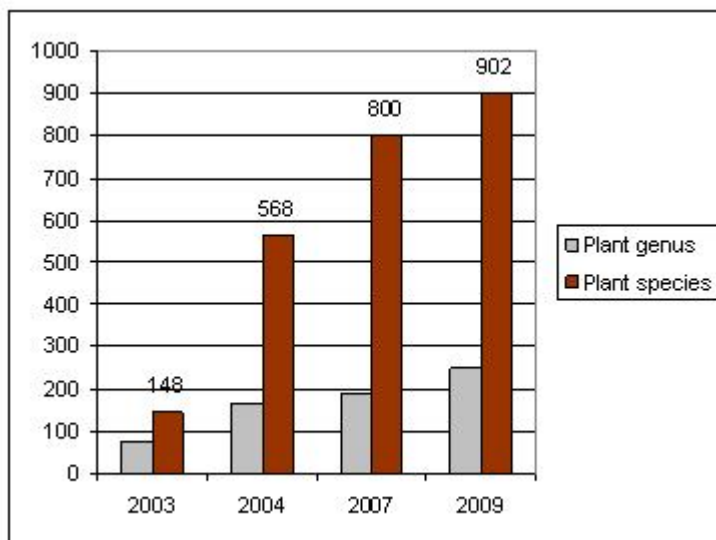


Fig.1. The number of mountain plants genus and species in collection 2003 – 2008.

This process depends not only on climatic conditions, but on the state of the plants in the vegetation period, its preparation to winter. It is identified that 387 species from 540 develop normally in the North Lithuania condition, i.e. pass the full seasonal cycle of development. 119 species freeze a little bit every year, but their decorativeness recovers in the season of vegetation. 34 species in collection are short-lived, obtain 2-3 years only and the other species

(*Androsace villosa* L., *Degenia velebitica* (Degen) Hayek, *Dianthus alpinus* L. etc.) decrease in number every year, especially after the winter. Some of the mountain plants species particularly those originated in alpine region grow in very special niches of the mountain, therefore it is difficult to create suitable growing condition. Alpine plants are particularly blighted on unstable winter circumstances, frequent thaws. These species can be grown successfully only in alpine

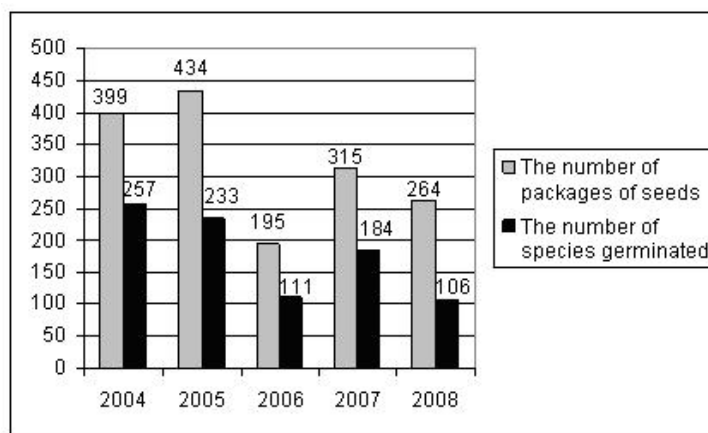


Fig.2 The number of the packages of seeds and the number of the species germinated in 2004 – 2008.

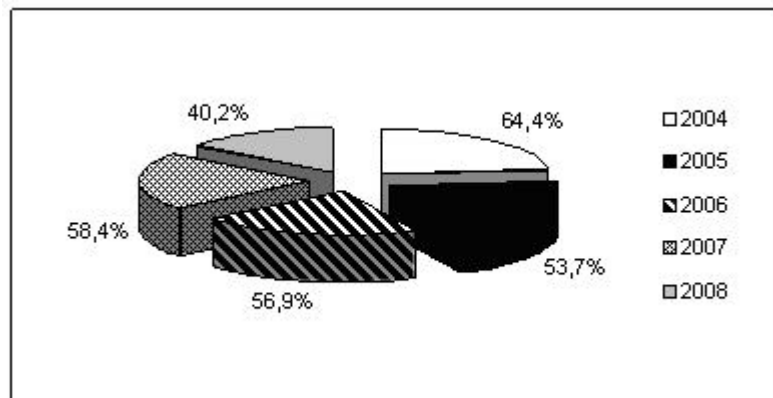


Fig.3 The viability of the seeds in 2004 – 2008.

house. In our botanic garden plants of *Lewisia* Pursh., *Calandrinia* Humb., *Celmisia* Cass., *Soldanella* L. genus are grown in frames.

Aspects of decorativeness

Every year the selection of perspective species is prosecuted while estimating the general condition of plants in collection. The decorativeness of mountain plants are determined not only by flowering, intensity of blossoms. The decorative value is determined by beauty of plant form as well. Some of the growing mountain species do not flower so intensively as they do in nature, and the colour of the blossoms is not so intensive as it is in natural habitat (because of the more intense ultraviolet radiation). For example introduced *Silene acaulis* (L.) Jacq. flowering not profusely, but it has decorative very dwarf cushion form. The part of the mountain plants in the collection are ever – green, dwarf, or prostrate (*Saxifraga* L., *Paronichia* Mill., *Globularia* L.). The decorativeness of these species is determined by long duration of greenery. In the latter year the collection augmented in decorative flowering plant genus *Campanula* L., *Primula* L., *Meconopsis* Vignier etc.

The intensive filling of the collection proceeds concerning the seeds exchange with botanic

gardens all over the world (Fig.2). In 2008, 264 packages of seeds were received from 43 world botanic gardens. 195 seeds of mountain plant species were included into 2008-2009 *Index seminum* catalogue of our botanic garden. The species of one genus frequently grow near to each others in botanic gardens therefore it is hard to avoid hybridization. These hybrids are trifling from a position of collection. There are engaged more and more seeds collected in natural growing places to the purpose to form qualitative collection. At the moment the bigger attention is paid to the rarity of the species. There are pursued to enlarge the variety of the genus that hybridization of the species would be avoided. There are these rarely grown genus in the initial stage of the introduction: *Endressia* J.Gay, *Margyricarpus* Ruiz & Pav., *Tibetia* (Ali) H.P., *Tonestus* A. Nels, *Cremanthodium* Bentham etc. The viability of sowed seeds balances from 53,7 % to 64.4 %. The hardly germinated seeds often are not affected by stratification or other used methods of viability. They germinate just when one or two years passes from the sowing. Therefore in 2008 the viability of the seeds reached only 40,2 % (Fig. 3).

The rare species

It was defined in 2009 spring that in the collection of mountain plants in our botanic garden there

are 75 (8.1 %) rare and endemic species, mostly from the Alps. Majority of these species are included in collection recently and their adaptational features just started to be investigated. Introduced rare plants are divided into three groups: 1. plants every year passing full cycle of ontogenesis; 2. plants in their development lacking the stage of maturing the seeds; 3. plants maintaining introduction for 1 – 2 years (Sidorovic, Lunina 1992). The observations show that the part of rare plants in the collection though maintains, but every year after the winter decreases the number of plants in the species, these plants are: *Campanula alpina* Jacq., *Sibbaldia procumbens* L., *Townsendia exscapa* (Richards.) Porter. These species are not long – lived and although they flowering, the self sowing is not noted. 22 rare and endemic species adapted well: *Alyssum argenteum* All., *Alyssum wulfenianum* Bernh., *Arabis allionii* DC., *Arnica alpina* (L.) Olin, *Asperula hexaphylla* All., *Campanula carpatica* Jacq., *Dryas drummondii* Richardson ex Hook., *Gentiana paradoxa* Albov., *Glaucium flavum* Crantz, *Globularia trichosantha* Fisch. & C. A. Mey, *Helianthemum arcticum* (Grosser) Janch., *Helianthemum canum* (L.) Baumg., *Leontopodium palibianum* P.B., *Minuartia austriaca* (Jacq.) Hayek., *Minuartia krascheninnikovii* Schischk., *Primula macrocalyx* Bunge, *Pulsatilla styriaca* (Pritzel) Simk., *Saponaria lutea* L., *Sempervivum pittonii* Schott., *Teucrium lucidum* L., *Veronica allionii* Vill., *Waldsteinia ternata* (Stephan) Fritsch.

Medicinal plants

One of the tasks for Botanical gardens raised from global strategy is the resource of medicinal plants, their preservation in the collections. In 2009 april while analysing lists of the mountain plants in the collection it was assessed that 64 (7.1 %) species are valuable not only as decorative plants but also have significant medicinal characteristics or are nutritional. 6 species from 39 *Gentiana* L. species growing in the collection are medicinal, namely *Gentiana cruciata* L., *G. kurroo* Royle, *G. lutea* L., *G. macrophylla* Pall., *G.*

purpurea L., *G. saponaria* L. The species well known in pharmacology also adapted well, they are *Arnica alpina* (L.) Olin, *Actea rubra* (Ait.) Willd., *Allium flavum* L., *Ephedra americana*, Humb. ex Willd., *E. distachya* L., *Rhodiola rosea* L.

It is projected to reinforce the value of the collection by paying more attention to investigate rare species, medicinal plants and their bioecological characteristics. The society shows great interest in mountain flora therefore we will seek to adjust the fund of collection and to use it in educative activities.

CONCLUSIONS

1. In the spring 2009 there were 902 plant taxa and cultivars belonging to 249 botanic genus and 53 families cultivating in the collection of mountain plants in Siauliai University Botanical garden. The species growing more then 5 years were evaluated. It was defined that 387 species from 540 observed ones adapted well. The condition of 119 species is satisfactory. Alpine plants are particularly blighted on unstable winter circumstances, frequent thaws. These species can be grown successfully only in alpine house or raised bed.

2. The seeds of plants are order from botanical gardens all over the world to the purpose to enhance the collection. The priority is given to the seeds collected in natural habitat. At the moment the bigger attention is paid to the medicinal characteristics of the species, the decorativeness of the plants and to the rarity of the species.

3. There are 75 rare and endemic species in the collection (22 species adapt well). In 2009 it was assessed that 64 species are valuable not only as decorative plants but also have significant medicinal characteristics or are nutritional.

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