

**TAXONOMIC STRUCTURE CHANGE OF CUPRESSACEAE BARTL.
FAMILY COLLECTION ON UNPROTECTED SOIL IN THE
BOTANICAL GARDEN OF THE NATIONAL UNIVERSITY OF LIFE
AND ENVIRONMENTAL SCIENCE OF UKRAINE**

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The change of Cypress family (*Cupressaceae* Bartl.) collection taxonomical structure in the Botanical garden of the National University of Life and Environmental Science of Ukraine is presented. According to the last inventory data the comparative analysis of species and forms structure is carried out and the perspectives of further introduction are determined.

Key words: *Cupressaceae* Bartl., the Cypress family, taxonomic structure, introduction, acclimatization.

The Cypress family (*Cupressaceae* Bartl.) plants are widespread in ornamental vegetation in Ukraine and the whole world what is a results of many adaptive features and high ornamentality.

As the result of introduction and testing in collections of the botanical gardens it is determined that the most adapted plants survive and have the highest health status. These are species, varieties, hybrids and forms within which a permanent selection is always made for the most valuable plants choosing and its use in production [9].

We periodically carry out an inventory and taxonomic structure analysis aimed for the pilot testing of conifer plants in the Botanical garden of the National University of Life and Environmental Science of Ukraine.

The last inventory which was carried out during 1992–1995 shown that in the conifer collection structure some changes are presented, namely, a number of species decreased which was the reason of the plants' phytocoenotic peculiarities and ability to grow in thickened stands [2]. As a result of carried out inventory

during 2003–2005 the database named “The arboretum collection of the Botanical garden of the National University of Life and Environmental Science of Ukraine” was made. It gave a possibility to specify data about the taxonomical structure, namely, about conifer collection [5].

The last inventory of conifers on unprotected soil in the Botanical garden was carried out in 2006 by workers of the laboratory of introduction and selection of woody plants in the Botanical garden of the National University of Life and Environmental Science of Ukraine [6].

The aim of research – taxonomic structure analysis of the Cypress family plants collection on unprotected soil in the Botanical garden of the National University of Life and Environmental Science of Ukraine, and further perspectives of conifer collection extension and protection.

The materials and methods of research. The study was carried out from 1992 to 2011 on unprotected soil of the collection plots in the Botanical garden of the National University of Life and Environmental Science of Ukraine. The objects of research were Cypress family (*Cupressaceae* Bartl.) plants which belong to division *Pinophyta* and class *Pinopsida*.

The research was carried out by means of rout observation of stands. For plant identification the special literature with taxonomic keys was used [7, 1, 8].

The results of research and its analysis. According to the last specified inventory data the collection of woody plants on unprotected soil in the Botanical garden of the National University of Life and Environmental Science of Ukraine have 389 species, 4 varieties, 2 forms, 33 hybrids and 176 cultivars (total number is 604), which belong to 144 genera, 57 families, 39 orders, 7 subclasses, 3 classes, 2 divisions [3].

Currently conifer plants collection on unprotected soil have 59 species, 1 variety, 1 hybrid and 94 cultivars (total number is 155), which belong to 17 genera, 4 families, 3 orders, 1 subclass.

The Cypress family collection on unprotected soil consists of 15 species, 1 hybrid, 75 cultivars. According to the obtained data the collection structure altered in different years (table).

The Cypress family (*Cupressaceae* Bartl.) taxonomic structure on unprotected soil in the Botanical garden of the National University of Life and Environmental Science of Ukraine in years of research

Genus	Years of research	Taxonomic structure				
		species	varieties	hybrids	cultivars	in total
<i>Chamaecyparis</i> Spach	1992	2	0	0	4	6
	2006	3	0	0	5	8
	2011	3	0	0	10	13
<i>Microbiota</i> Kom.	1992	1	0	0	0	1
	2006	1	0	0	0	1
	2011	1	0	0	0	1
<i>Thujopsis</i> Siebold et Zucc. ex Endl.	1992	1	0	0	0	1
	2006	1	0	0	0	1
	2011	1	0	0	0	1
<i>Thuja</i> L.	1992	2	0	0	8	10
	2006	2	0	0	16	18
	2011	2	0	0	33	35
<i>Platycladus</i> Spach	1992	1	0	0	0	1
	2006	1	0	0	1	2
	2011	1	0	0	1	2
<i>Juniperus</i> L.	1992	4	0	0	4	8
	2006	7	0	1	8	16
	2011	7	0	1	31	39
In total	1992	11	0	0	16	27
	2006	15	0	1	30	46
	2011	15	0	1	75	91

From the obtained data we can see that the Cypress family includes 91 taxa what is almost 2/3 of all conifers in arboretum. There was a significant increase of collection during last years (plus 45 taxa), namely, by means of tested ornamental cultivars from *Thuja* and *Juniperus* genera. It could be a result of its high ornamentality and necessity of study base development for training of students of Park Gardening and Landscape Architecture Faculty of the National University of Life and Environmental Science of Ukraine.

Especially valuable in the cypress species collection are plants which belong to the Red Book of International Union for Conservation of Nature, IUCN [4]. According to the last inventory there are 15 cypresses on unprotected soil in the National University of Life and Environmental Science of Ukraine which are in the Red List of IUCN. Among them 12 species belong to Least Concern (LC) – lowest risk. Does not qualify for a more at risk category. Widespread and abundant taxa are included in this category; 2 species – to Near Threatened (NT) – likely to become endangered in the near future; 1 species – to Vulnerable (VU) – high risk of endangerment in the wild.

Among the rare cypresses which grow in arboretum of the Botanical garden are species with relatively not big native ranges mostly connected to mountains (endemics or almost endemics), namely, *Chamaecyparis lawsoniana* (A.Murray) Parl., *Ch. obtusa* (Siebold et Zucc.) Endl., *Ch. pisifera* (Siebold et Zucc.) Endl., *Thuja dolabrata* (Thunb. ex L. f.) Siebold et Zucc.

It turned out that the vast majority of rare cypresses in condition of the Botanical garden were frost-resistant and drought-resistant. Some little frost damages have *Chamaecyparis pisifera*. In some years *Chamaecyparis lawsoniana*, *Juniperus communis* L., *Thuja dolabrata* have considerable frost damages. In heat periods some plants have less turgor pressure without dieback of needles and twigs. The level of Cypress family plants adaptation is mostly determined by its reproductive ability. *Thuja occidentalis* L. was the most adaptive in recent years. We have not seen any species indications of naturalization (self-sown seed and saplings).

It should be noted that according to the many years observation we thought that Eastern Red-cedar, Northern White Cedar and Chinese arborvitae are resistant in the Botanical garden of the National University of Life and Environmental Science of Ukraine. But it found out that, according to our experience, frost damages of these plants could be considerable. Especially critical for a health status of these plants was winter period between 2012 and 2013 when much of rain and snow mixed caused many damages of trees.

In our opinion further formation of cypresses collection in the Botanical garden of the National University of Life and Environmental Science of Ukraine must be provided for the study process and for the scientific purposes as well in such ways: re-introduction of lost species; cultivation of species of Ukrainian Red Book, Ukrainian Green Book, the Red Book of IUCN; cultivation of local flora species; ornamental forms increase by means of woody plants valuable cultivars.

Conclusions

1. The vast majority of *Cupressaceae* family plants in conditions of the Botanical garden of the National University of Life and Environmental Science of Ukraine have quite good adaptation during period of introduction. It gave us a possibility to increase the collection during last 5 years to 45 taxa (now it is equal to 1/2 of the total cypresses taxa in collection).

2. The change of taxonomic structure of cypresses on unprotected soil in the Botanical garden was made by means of increase of tested *Thuja* and *Juniperus* genera ornamental cultivars. It is the reason of its high ornamentality and necessity of study base development for training of students of Park Gardening and Landscape Architecture Faculty of the National University of Life and Environmental Science of Ukraine.

3. Further increase of the *Cupressaceae* family collection in the Botanical garden should be carried out in such ways: re-introduction of lost species; cultivation of species of Ukrainian Red Book, Ukrainian Green Book, the Red Book of IUCN; cultivation of local flora species; ornamental forms increase by means of woody plants valuable cultivars.

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**ЗМІНА ТАКСОНОМІЧНОГО СКЛАДУ КОЛЕКЦІЇ РОСЛИН
РОДИНИ CUPRESSACEAE BARTL. В УМОВАХ НЕЗАХИЩЕНОГО
ҐРУНТУ БОТАНІЧНОГО САДУ НУБІП УКРАЇНИ**

С.І. СЛЮСАР

Наведено відомості щодо зміни таксономічного складу колекції рослин родини кипарисових (Cupressaceae Bartl.) у насадженнях коніферетуму Ботанічного саду Національного університету біоресурсів і природокористування України. За результатами останніх інвентаризацій проведено порівняльний аналіз видового та формового складу, визначено перспективи подальшої інтродукційної роботи.

Ключові слова: *Cupressaceae Bartl., родина кипарисових, таксономічний склад, інтродукція, акліматизація.*

**ИЗМЕНЕНИЕ ТАКСОНОМИЧЕСКОГО СОСТАВА КОЛЛЕКЦИИ
РАСТЕНИЙ СЕМЕЙСТВА CUPRESSACEAE BARTL. В УСЛОВИЯХ
ОТКРЫТОГО ГРУНТА БОТАНИЧЕСКОГО САДА НУБИП УКРАИНЫ**

С.И. СЛЮСАРЬ

Приведены сведения об изменении таксономического состава коллекции растений семейства кипарисовых в насаждениях кониферетума Ботанического сада Национального университета биоресурсов и природопользования Украины. По результатам последних инвентаризаций проведен сравнительный анализ видового и формового состава кипарисовых, определены перспективы дальнейшей интродукционной работы.

Ключевые слова: *Cupressaceae Bartl., семейство кипарисовых, таксономический состав, интродукция, акклиматизация*

