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ANALYSIS OF THE RARE WOODY PLANTS USED IN GREENERY FOR PHYTOGEOGRAPHIC REGION, LIFE FORM AND IUCN CATEGORIES

©Novruzov V., Ph.D., Institute of Dendrology of Azerbaijan National Academy of Sciences,
Baku, Azerbaijan

©Iskender E., Dr. habil., Central Botanical Garden, Azerbaijan National Academy of Sciences,
Baku, Azerbaijan, zerbaijanacae55@hotmail.com

©Mammadov T., Dr. habil., member corr. Azerbaijan National Academy of Sciences, Institute of
Dendrology of Azerbaijan National Academy of Sciences,
Baku, Azerbaijan, dendrary@mail.az

©Abbasov R., Central Botanical Garden, Azerbaijan National Academy of Sciences,
Baku, Azerbaijan, elnur.abbasov.81@bk.ru

©Rustamova F., Institute of Dendrology of Azerbaijan National Academy of Sciences,
Baku, Azerbaijan, fakhridakhanum@gmail.com

©Bagirova Sh., Central Botanical Garden, Azerbaijan National Academy of Sciences,
Baku, Azerbaijan, shafaqbagirova90@gmail.com

АНАЛИЗ ПО КАТЕГОРИЯМ ОПАСНОСТИ (МСОП), ФИТОГЕОГРАФИЧЕСКОМУ РЕГИОНУ И ЖИЗНЕННЫМ ФОРМАМ РЕДКИХ ДРЕВЕСНЫХ РАСТЕНИЙ, ИСПОЛЬЗУЕМЫХ В ОЗЕЛЕНЕНИИ

©Новрузов В. М., канд. биол. наук, Институт дендрологии НАН Азербайджана,
г. Баку, Азербайджан, dendrary@mail.az

©Искендер Э., д-р биол. наук, Центральный ботанический сад НАН Азербайджана,
г. Баку, Азербайджан, acae55@hotmail.com

©Мамедов Т. С., д-р биол. наук, член корр. НАН Азербайджана, Институт дендрологии НАН
Азербайджана, г. Баку, Азербайджан, dendrary@mail.az

©Аббасов Р. М., Центральный ботанический сад НАН Азербайджана,
г. Баку, Азербайджан, elnur.abbasov.81@bk.ru

©Рустамова Ф. Н., Институт дендрологии НАН Азербайджана,
г. Баку, Азербайджан, fakhridakhanum@gmail.com

©Багирова Ш. А., Центральный ботанический сад НАН Азербайджана,
г. Баку, Азербайджан, shafaqbagirova90@gmail.com

Abstract. According to hazard categories (IUCN), 46 species from 35 genera were identified belonging to 24 families of rare tree and shrub plants common in the natural flora of Azerbaijan used for landscaping Absheron. As a result of the analysis, it was found that the NT category (almost endangered) includes 12 species, and the CR category (endangered) includes 8 species. The plant species studied in the article were also analyzed by phytogeographic region and life forms. The results of the study showed that in addition to landscaping, other measures for the protection of the studied plants are necessary.

Аннотация. По категориям опасности (МСОП) определены 46 видов из 35 родов относящиеся к 24 семействам редких древесно-кустарниковых растений, распространенных в естественной флоре Азербайджана, используемых для озеленения Апшерона. В результате анализа было установлено, что категория NT (почти под угрозой исчезновения) включает 12 видов, а категория CR (находится под угрозой исчезновения) — 8 видов. Изученные в статье виды растений также были проанализированы по фитогеографическому региону и



жизненным формам. Результаты исследования показали, что помимо озеленения необходимы и другие меры охраны исследуемых растений.

Keywords: rare, tree-shrub, hazard categories, endemic, relict.

Ключевые слова: редкие, древесно-кустарниковые, категории опасности, эндемик, реликт.

Azerbaijan has unique vegetation according to geographical location, relief, soil and climate conditions. There are about 5,000 plants in the flora of Azerbaijan. It defined, that dozens of these species are in danger. According to the research, the number of wooden plants currently in need of protection in the natural flora of Azerbaijan is close to 189 species [1–3]. According to the literature information, there are 467 existed species of trees and shrubs in the flora of Azerbaijan [4–6]. It turns out that woody plants that need protection are 38% of the total number of trees and shrubs in our flora. The need of such protection means these plants are facing in a high risk.

The preservation of the ecological balance, the protection and use of natural resources are among the most important problems facing people. To solve these problems, the environment should be protected and the natural resources should be used efficiently and the plants that need protection should be widely used in greenery [5].

As we know, the increasing number of population in the world and the increasing impact of this growth on the environment are increasing. From this point of view, it is important to implement a number of measures to protect the wildlife, including the flora. To solve this problem many laws and decisions have been made in the countries of the world, including Azerbaijan. It is known that one of the ways of protecting rare plants is to use those plants in the greenhouses.

The first edition of the “Red Book” of Azerbaijan was published in 1989, then in 2013 the second edition of the book was published. In the first edition 140, in the second edition 300 rare plants and mushrooms were found in the Red Book. In 2013, 50 rare plant species were included to the book and danger categories were identified [6–7].

Some researchers show in their works that up to 10 plant species have been destroyed in natural conditions of Azerbaijan or have fewer individuals in their territory. These rare tree plants, which are in critical conditions, are *Laurocerocus officinalis* M. Roem., *Padus avium* Mill, *Calligonum bakuense* Litv. and so on. The authors show that there are 416 rare plant species in Azerbaijani flora [4].

Many researchers have done researches to preserve rare plants in their own country and have given their recommendations [6–7].

It is important to state and justify the need for protection of any plant species in different countries, including Azerbaijan. While preparing a list of rare and endangered plants, it is important to be aware of these taxa by the people who work in nature, preserve and greenery [8–9].

Materials and Methods

This research consists of rare and endangered trees and shrubs spread throughout Azerbaijan flora. The main purpose of this research is to define the locations of plants in various phytogeographic regions according to danger categories. By preparing the research works were used methodic [1, 3, 8, 10].

Results and Discussions

It is known that the types of plant species known in the world flora, especially those found in a narrow range of territories, they are within the scope of the internationally accepted danger categories and then to there are taken direct measures to more endangered plants.



As we know, one of the three species of trees and shrubs that are in our republic needs discussion. From this point of view research study has been done in this direction.

In the research, 46 species belong to 24 families, 35 genera were evaluated according to the IUCN 3.1 version of danger category. These species are rare and endangered species in Azerbaijani flora and it is widely used for the greenery of cities and settlements located on the Absheron peninsula (Table 2).

The endemic, relicts and rare of the plants studied by our research team are split into different categories according to the criteria of the IUCN Red List — Categories and Criteria (version 3.1) (Table 1).

Table 1.

THE ENDEMIC, RELIC AND RARE PLANTS AND THEIR DANGER CATEGORIES
WITHIN THE SPECIES

<i>Categories</i>	<i>Endemic</i>	<i>Relict</i>	<i>Rare</i>
EX	—	—	—
EW	—	—	1
CR	—	4	4
EN	—	6	1
VU	—	1	5
NT	2	3	7
LC	—	—	5
DD	—	—	6
NE	—	1	—

EX — extincted, EW — extinct in the wild, CR — critically endangered, EN — endangered, VU — vulnerable, NT — near threatened, LC — least concern, DD — data deficient, NE — not evaluated.

The analysis revealed that there were 12 species of NT (near threatened) category and 8 species of CR (critically endangered). Here it is possible to conclude that the current condition of rare trees and shrubs in the flora of our country is not satisfactory. This is about 30–40% of trees and shrubs that need protection in the Azerbaijani flora. If the number of rare plants increases in this direction, the majority of these plants will face the threat of gene pool in the near future.

When analyzing the distribution of trees and shrubs in danger categories according to the category of version 3.1 of the IUCN, it was revealed that the EW category was included in the taxon (*Laurocerasus officinalis* M. Roem.). Currently, these plant species are in a cultivated condition.

As mentioned above, plant species included in the CR (critically endangered) and NT (near threatened) categories constitute 43% of the investigated taxa. Other categories include 5 species of EN (endangered) of 7 species of LC (least concern) 5 species of VU (vulnerable). There were 2 species of DD (data deficient) and 2 taxa NE (not evaluated).

The results of the analyzes show that 29 of the studied plants are rare, 16 are relicts and 2 are endemic.

When considering the distribution of the studied plants in the phytogeographic region, it was revealed that 22 species of Mediterranean, 19 species of Iran–Turan, and 5 species are elements of the European-Siberian phytogeographic region (Figure 1).

Due to the impact of biotic and abiotic factors on the destruction of ecological balance, there will be uncertainty in the distribution of rare wooden plants in endangered categories in the flora of Azerbaijan in certain categories of IUCN over time. From this point of view, the division of rare plants into categories after a certain period of time should be revised.

Table 2.
 ANALYSIS OF THE RARE WOODY PLANTS USED IN GREENERY FOR PHYTOGEOGRAPHIC REGION, LIFE FORM AND IUCN

№	Species	Phytogeographic region	Life form	CATEGORIES													
				EX	EW	CR	EN	VU	NT	LC	DD	NE	Relic	Rare	Endemic		
<i>Pinophyta</i>																	
1	<i>Taxus baccata</i>	Mediterranean	Mezophanerophytes			B1b (I,II,IV)											+
2	<i>Juniperus foetidissima</i>	Mediterranean	Mezophanerophytes					A4a:Bb (II,III,IV)									+
3	<i>Juniperus sabina</i>	Mediterranean	Nanophanerophytes							+							+
4	<i>Ephedra equisetina</i>	irano-Turanian	Nanophanerophytes								+						+
5	<i>Pinus eldarica</i>	Mediterranean	Mezophanerophytes							+							+
<i>Magnoliophyta</i>																	
6	<i>Acer ibericum</i>	irano-Turanian	Microphanerophyte														+
7	<i>Acer pseudoplatanus</i>	Euro-Siberian	Megophanerophytes			A1abc; B1ab(I,III)				+							+
8	<i>Albizia julibrissin</i>	irano-Turanian	Mezophanerophytes					A1ac;B1b (I,IV)									+
9	<i>Buxus hyrcana</i>	Mediterranean	Microphanerophytes														
10	<i>Buxus colchica</i>	Mediterranean	Microphanerophytes					B2b (I, II,IV)									
11	<i>Caragana grandiflora</i>	irano-Turanian	Nanophanerophytes								+						+
12	<i>Carpinus macrocarpa</i>	Mediterranean	Microphanerophyte							+							+
13	<i>Castanea sativa</i>	Mediterranean	Megophanerophytes								+						+
14	<i>Celtis caucasica</i>	Mediterranean	Mezophanerophytes														+
15	<i>Celtis australis</i>	Mediterranean	Mezophanerophytes														+
16	<i>Celtis glabrata</i>	Euro-Siberian	Mezophanerophytes								+						+
17	<i>Corylus colurna</i>	Mediterranean	Mezophanerophytes														+



№	Species	Phytogeographic region	Life form	EX	EW	CR	EN	VU	NT	LC	DD	NE	Reli c	Rare	Ende mic
18	<i>Danae racemosa</i>	İrano-Turanian	Nanophanerophytes				A1abd:B1b(I,IV)						+		
19	<i>Diospyros lotus</i>	Mediterranean	Mezophanerophytes				A1abd:B1b(I,IV)					+			
20	<i>Ficus hyrcana</i>	Mediterranean	Mezophanerophytes						+						+
21	<i>Hedera helix</i>	Mediterranea	Mezophanerophytes									+			
22	<i>Hedera pastuchowii</i>	İrano-Turanian	Mezophanerophytes			A1abc:B1b(I,IV)							+		
23	<i>Hippophae rhamnoides</i>	Mediterranean	Mezophanerophytes			A1ab:B1bc(III,IV)		+						+	
24	<i>Ilex hyrcana</i>	Avropa-Sibir	Mezophanerophytes										+		
25	<i>Juglans regia</i>	Mediterranean	Megophanerophytes						+					+	
26	<i>Laurocerasus officinalis</i>	Mediterranean	Microphanerophytes		+									+	
27	<i>Parroita persica</i>	İrano-Turanian	Mezophanerophytes							+			+		
28	<i>Platanus orientalis</i>	Mediterranean	Megophanerophytes				A1ad:B2b(I,IV)						+		
29	<i>Pistacia mutica</i>	Mediterranean	Microphanerophytes			B1ab(I,II,IV)								+	
30	<i>Populus hyrcana</i>	İrano-Turanian	Mezophanerophytes				B2ab(I,III)							+	
31	<i>Populus pseudonivea</i>	Mediterranean	Megophanerophytes							+				+	
32	<i>Pyrus salicifolia</i>	İrano-Turanian	Mezophanerophytes			B1b(I,IV)								+	
33	<i>Pyrus caucasica</i>	İrano-Turanian	Mezophanerophytes					+						+	
34	<i>Pyracantha coccinea</i>	Mediterranean	Microphanerophytes					B2ab(I, III)						+	
35	<i>Quercus castaneifolia</i>	İrano-Turanian	Megophanerophytes					B1b(I,II,IV)					+		



№	Species	Phytogeographic region	Life form	EX	EW	CR	EN	VU	NT	LC	DD	NE	Reli c	Rar e	Ende mic
36	<i>Quercus iberica</i>	irano-Turamanian	Megophanerophytes								+			+	
37	<i>Quercus macranthera</i>	irano-Turamanian	Mezophanerophytes								+			+	
38	<i>Quercus pubescens</i>	irano-Turamanian	Mezophanerophytes								+			+	
39	<i>Rhus coriaria</i>	Mediterranean	Microphanerophytes					A1ab; B1b (I, II, IV)						+	
40	<i>Rubus buschii</i>	Euro-Siberian	Nanophanerophytes								+			+	
42	<i>Ruscus hyrcanus</i>	irano-Turamanian	Nanophanerophytes				B1ab (I, II, IV)							+	
43	<i>Salix caucasica</i>	irano-Turamanian	Nanophanerophytes								+			+	
44	<i>Sorbus caucasica</i>	irano-Turamanian	Microphanerophytes								+			+	
45	<i>Staphylea colchica</i>	Euro-Siberian	Microphanerophytes			B2b (I, II, III)								+	
46	<i>Vitis sylvestris</i>	irano-Turamanian	Mezophanerophytes						+					+	
47	<i>Zelkova carpinifolia</i>	irano-Turamanian	Mezophanerophytes						+					+	



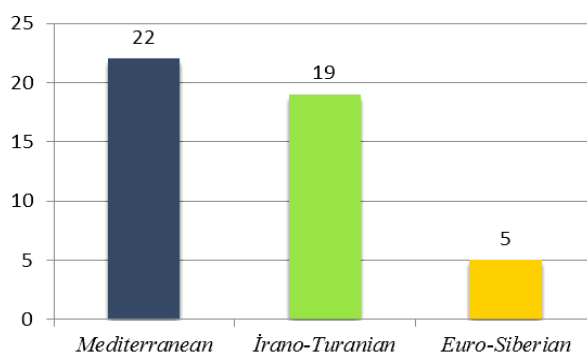


Figure 1. Distribution of the studied species by phytogeographic regions.

As a result of the analysis, it was found out that 6 species of nanofanerophyte, 10 species of microfanerophyte, 23 species of mesofanerophyte and 7 species are megofanerophytes (Figure 2).

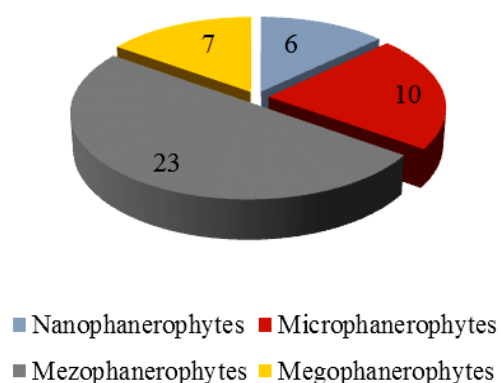


Figure 2. Life forms of studied species.

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