**The flora of Azerbaijan. Ethnobotany**

The Republic of Azerbaijan has a very rich flora. There are more than 4,500 species of higher plants here. The flora of Azerbaijan is much richer in the number of species than the flora of the other republics of the South Caucasus. Sixty-six per cent of the species growing in the whole Caucasus can be found in Azerbaijan.The richness of Azerbaijan's flora and the variety of its vegetation results from the variety and richness of its physical-geographic and natural-historic conditions and from its compound history influenced by the remote floristic regions.

Relict genera of the tertiary period can be frequently found in all the zones of Azerbaijan, especially in Talysh. They are the iron tree (Parrotia persica), the Lenkoran acacia (Albizzia julibrissin), the basket oak (Quercus castaneifolia), the Caucasian persimmon (Diospyrus lotus), the evergreen shrub of Ruscus hyrcana, the box tree (Buxus hyrcana), etc. There are 240 endemic species of plants in Azerbaijan.

**The floristic areas of Azerbaijan**

All types of floristic areas- ancient wood, boreal, plain, xerophytic, desert, Caucasian and accidental- exist in Azerbaijan. The representatives of ancient wood type are widely spread in the Talysh region and the location which is suitable for boreal type is the high mountains of Great and Minor Caucasus. The plain, Caucasian, xerophytic and desert types belong to foothills, the lowlands, especially Kur-Araz lawland.

**Hyrcanian Forest**

In the forests of Azerbaijan various relict trees may be observed. One of these forests is Hyrcanian (Hirkan) which is in the south of Azerbaijan. These relict trees’ decorative leaves, strong trunks, large crowns have attracted many naturalists, botanists from all over the world. The climate of Hyrcanian forests of Talysh mountains is humid and warm. This area is the most biodiversified area of Elburz Mountains compared to the other neighboring areas with the 95 tree species, 110 shrubs, more than 1000 other higher plant species.

The well-known relict trees of Hyrcanian Forests

The relict trees hold a socio-economic importance and even cultural significance.

• Cappadocian Maple (Acer cappadocicum)

• Velvet Maple (Acer velutinum)

• Persian Silk Tree (Albizia julibrissin)

• Caucasian Alder (Alnus subcordata)

• Caucasian Persimmon (Diospyros lotus)

• Caspian Locust (Gleditsia caspica)

• Persian Ironwood (Parrotia persica)

• Caucasian Wingnut (Pterocarya fraxinifolia)

• Chestnut-leaved Oak (Quercus castaneifolia)

• Caucasian Zelkova (Zelkova carpinifolia)

**The vegetation in arid regions**

In the Nakhchivan Autonomous Republic, Jabrayil, Zanghelan, Steppe Plateau, Zuvand regions of republic which have arid climate, a specific mountainous xerophytic vegetation is developed. The species of thyme (Thymus) are very typical of those arid regions. The following species are specific there: Lactuca, Berberis, Zygophyllum atriplicoides, Astragalus szovitsii, Salvia dracocephaloides, Pyrethrum, Marrubium, Achillea, Phlomis, etc.

In Eldar Oyugu which is located in the northwest of Azerbaijan has also arid climate and there is an isolated spot of typical thin forest formed by Pinus eldarica, which is an endemic relict of the tertiary period. This forest has such higher plant species as juniper, pistachio, Paliurus spina-christi and 30-35 others. These species obviously belong to the mountainous xerophytic type.

**Tugai Forests**

Tugai forests lie through the major rivers Kura, Araz, Ganikh, Gabirri. The southern willows, mulberry trees, elms, pomegranates, hybrid-type poplars, Elaeagnus, Tamarix, etc. grow in these forests. Sometimes the shrubs can form a mixed forest along the sides of mountainous rivers or in river valleys, e. g. Hippophae rhamnoides, Elaeagnus, willows (Salix), Rhus coriaria, Tamarix, mulberries, pomegranates, wild roses, blackberries, etc. Hippophae rhamnoides is spread in the valleys of the Shin, Kish, Damiraparan, Turyan, Geychay, Agsu, Velvele and Terter rivers. Along the rivers of Talysh Pterocarya pterocarpa and Alnus subcordata can be observed. Another species of alder, Alnus barbata, is typical in Talysh. Local endemic species of fig (Ficus hyrcanica), Humulus lupulus, Smilax excelsa, Sambucus ebulus, Carex of many species, Cardamine, Poa, etc. are typical for the coastal forests of Talysh.

**Pine tree**

Two species of pine trees are spread in Azerbaijan: Pinus eldarica and Pinus Kochiana. The first one grows on the Steppe Plateau at 600 m above sea level, the second one grows in at 1,600 m above sea level in the region of Gyok-Gyol and in the Bulanig river valley of the Belokan region.

**Species in places which are above sea level**

At 1,800-3,200 m above sea level alpine and sub-alpine meadows, meadow steppes are observed. Mainly high grasses like Heracleum, Achillea, Cephalaria gigantea, Filipendula ulmaria, Calamagrostis arundinacea, Brachypodium silvaticum, Agrostis capillaris, Poa nemoralis, Koeleria gracilis, Vicia, Melilotus, clover (Trifolium), Verbascum, Aconitum, Delphinium, Dactylis glomerata, various species of the Rose family are specific species for that places. Sub-alpine meadows` formation depends on relief and macro climatic peculiarities. The sub-alpine belt consists of mesophytic meadows and drier meadow-steppes which includes various species of cereals and clover, Geranium, Inula, Cephalaria, Scabiosa, Galium, Tragopogon, Betonica, Primula, Plantago, Rumex, Urtica, Cirsium, etc. According to the investigations there are about 1,000 species are spread in sub-alpine meadows.

**The plants with healing effects**

In the Middle Age Azerbaijan medicine 365 plant species were used for treatment, whereas in modern Azerbaijan medicine only 230 of them are in use and the other 135 species are considered as lost medicinal plants for new generations.

|  |  |  |
| --- | --- | --- |
| **Medical Plants** | **Medically important parts of the plants** | **The diseases which are healed** |
| [Berberis vulgaris](https://en.wikipedia.org/wiki/Berberis_vulgaris) | Leaves, root, grass and fruits | [Rickets](https://en.wikipedia.org/wiki/Rickets), [anaemia](https://en.wikipedia.org/wiki/Anemia), [tonsillitis](https://en.wikipedia.org/wiki/Tonsillitis), [malaria](https://en.wikipedia.org/wiki/Malaria), [arthralgia](https://en.wikipedia.org/wiki/Arthralgia), [icterus](https://en.wikipedia.org/wiki/Jaundice),  [gastrointestinal diseases](https://en.wikipedia.org/wiki/Gastrointestinal_disease), [antitussive](https://en.wikipedia.org/wiki/Cough_medicine) |
| [Crataegus pentagyna](https://en.wikipedia.org/wiki/Crataegus_pentagyna) | Fruits and flowers | Has a chronotropic and positive inotropic effect on  heart muscle, improves heart and brain circulation,  used in the treatment of [arrhythmia](https://en.wikipedia.org/wiki/Heart_arrhythmia), [tachycardia](https://en.wikipedia.org/wiki/Tachycardia) and  [hypertension](https://en.wikipedia.org/wiki/Hypertension) |
| [Althaea officinalis](https://en.wikipedia.org/wiki/Althaea_officinalis) | Root | [Respiratory tract infections](https://en.wikipedia.org/wiki/Respiratory_tract_infection), [gastric ulcer](https://en.wikipedia.org/wiki/Peptic_ulcer_disease), diarrhoea,  acute gastritis, [cystitis](https://en.wikipedia.org/wiki/Urinary_tract_infection), [quinsy](https://en.wikipedia.org/wiki/Peritonsillar_abscess) |
| [Hippophae rhamnoides](https://en.wikipedia.org/wiki/Hippophae_rhamnoides) | Fruits | Trophic sores, [moniliasis](https://en.wikipedia.org/wiki/Candidiasis), [respiratory tract infections](https://en.wikipedia.org/wiki/Respiratory_tract_infection),  [skin tuberculosis](https://en.wikipedia.org/wiki/List_of_cutaneous_conditions), [cancer](https://en.wikipedia.org/wiki/Cancer) |
| [Vaccinium vitis idaea](https://en.wikipedia.org/wiki/Vaccinium_vitis-idaea) | Leave and ripen fruits | [Liver diseases](https://en.wikipedia.org/wiki/Liver_disease), [gastritis with low acidity](https://en.wikipedia.org/wiki/Gastritis), [rheumatoid](https://en.wikipedia.org/wiki/Rheumatoid_arthritis)  [arthritis](https://en.wikipedia.org/wiki/Rheumatoid_arthritis), nocturnal enuresis, [diarrhoea](https://en.wikipedia.org/wiki/Diarrhea), [antihelminthic](https://en.wikipedia.org/wiki/Anthelmintic) |
| [Vaccinium myrtillis](https://en.wikipedia.org/wiki/Vaccinium_myrtillus) | Leave and berries | [Nocturnal enuresis](https://en.wikipedia.org/wiki/Nocturnal_enuresis), [arthralgia](https://en.wikipedia.org/wiki/Arthralgia), [gastritis](https://en.wikipedia.org/wiki/Gastritis), chronic  [tonsillitis](https://en.wikipedia.org/wiki/Tonsillitis), [moniliasis](https://en.wikipedia.org/wiki/Candidiasis), deformation of joints, [dysentery](https://en.wikipedia.org/wiki/Dysentery),  [enterocolitis](https://en.wikipedia.org/wiki/Clostridium_difficile_infection), acute and [chronic gastroenteritis](https://en.wikipedia.org/wiki/Gastroenteritis) |
| [Inula helenium](https://en.wikipedia.org/wiki/Elecampane) | Root and [rhizome](https://en.wikipedia.org/wiki/Rhizome) | [Gastrointestinal diseases](https://en.wikipedia.org/wiki/Gastrointestinal_disease), gastric and small bowel  diseases, [common cold](https://en.wikipedia.org/wiki/Common_cold), [bronchitis](https://en.wikipedia.org/wiki/Bronchitis), [antihelminthic](https://en.wikipedia.org/wiki/Anthelmintic),  [antitussive](https://en.wikipedia.org/wiki/Cough_medicine) |

**Floristic areas In the flora of Azerbaijan**

In the flora of Azerbaijan there are representatives of all the types of floristic areas, e.g. ancient wood, boreal, plain, xerophytic, desert, Caucasian and accidental. The representatives of the ancient wood type are most widely spread in the region of Talysh, and the boreal type is spread in the high mountains of the Minor and Great Caucasus and a little in the lower areas. Meanwhile, the xerophytic, Caucasian, plain and desert types are spread on the lowlands, foothills, the Steppe Plateau and, most of all, on the Kura-Araz lowland. The accidental type of floristic areas is represented inconsiderably. In the Kura-Araz, Near Caspian and other lowlands there are many lakes, pools and bogs rich in vegetation.  
  
Cosmopolite-like thickets of reed (Phragmites communis) are widely spread along rivers and irrigation canals, in boggy places and, locally, in the lowland districts. In them one can find Alopecurus myosuroides, Cynanchum acutum, Cressa cretica, Typha sp., Echinochloa, Calamagrostis, etc. Here Erianthus purpurascens of obviously savanna type has been preserved.  
  
In the ditches of the Kura-Araz plain Cynodonetum (Cynodon dactylon), Glycyrrhizetum (Glycyrrhiza glabra) and Bolboschoenus maritimus is spread more or less widely. In the Karabakh plain more often occur Limonium scoparium, Polygonum patulum, Stachys palustris, Lythrum salicaria, Iris, etc. They form thickets and also occur in those produced by other species.  
  
In the dead water and estuaries (especially the Agzibirchala estuary) an abundance of Typha species occurs. Rather typical are Nelumbium caspicum, Nymphaea alba, Nymphoides peltatum, Utricularia vulgaris occurring here and there. Widely spread is Salvinia natans and other aquatic plants. They also often occur in the Kura-Araz lowland. The thickets of Arundo donax are also typical of the lowlands.  
  
Marshy territories are widely spread in the territory of the Talysh plain. There are marshes with predominant Potamogeton pectinatus, Myriophyllum spicatum, Trapa hyrcana, Ceratophyllum demersum, Iris pseudocorus, Sparganium erectum, Heleocharis eupalustris, and others. In drying marshes scattered all over the plain typical are short plants. Among them the most widely spread are Ranunculus ophioglossifolius, Buschia lateriflora, Lippa nodiflora, Mentha aquatica, Polygonum minus, Alisma plantago, etc.  
  
Water-boggy plants occur also in foothills and in mountainous zones of different heights. They are especially numerous in sub-alpine zones, where more than 100 marshes and marshy habitats are represented.  
  
Vast areas of the Kura-Araz, Near Caspian and other plains are covered with desert and semi-desert vegetation. Halocnemetum is most developed in the saline deserts. Short bushes of Halocnemum strobilaceum contribute to formation of hummocks. Especially large hummocks are observed in the saline places of Lokbatan, Mugan and East Shirvan. Kalidietum is developed mainly on the Near Caspian plain and in the Kura-Araz lowland.  
  
**Wormwood formations** (Artemisietum) are the most widely spread type of desert vegetation. It is mainly developed on fine-earth alkaline gray soils of low salinity. They often form semi-desert formations with Salsola species or perennial cereals. All the kinds of Artemisietum include 30-35 or even 50-55 species of ephemeral and sub-ephemeral plants. E.g., Poa bulbosa, Bromus japonicus, Lolium rigidum, Eremopyrum orientale, Erodium cicutarium, Medicago minima, Medicago coerulea, etc. are believed to be constant members of wormwood formations. Low shrubs also occur in those communities. The littoral and sandy coastal soils are habitats for Artemisia arenaria, Artemisia scoparia, Convolvulus persicus, Melilotus caspius, Astragalus hyrcanus and dozens of ephemeral plants. The rare species richly represented in the coastal vegetation of Apsheron are mainly observed in spring, when they are biologically active. Then they fade soon.

As for the semi-steppe and steppe vegetation, it mainly includes copiously spread cereals, such as Festuca, Stipa, Agropyrum cristatum, and also Medicago transcaucasica, Centaurea reflexa, Gypsophyla steveni, Teucrium polium and other perennial and annual species. Mountainous xerophytic vegetation often mixes with steppe formations, producing particular communities.  
  
In the torrid regions of the republic (the Nakhchivan Autonomous Republic, Jabrayil, Zanghelan, Steppe Plateau, Zuvand) a specific mountainous xerophytic vegetation is developed, forming communities known under the names of Phrygana, Shiblyak, Tragakanth, Acantholimon, juniper, pistachio and other formations, etc. The Phrygana of Nakhchivan is very diverse at 1,000 to 1,500 meters above the sea level, with more than 300 species represented. The species of thyme (Thymus) are very typical of those arid habitats. The following species are often observed there: Lactuca, Berberis, Zygophyllum atriplicoides, Astragalus szovitsii, Salvia dracocephaloides, Pyrethrum, Marrubium, Achillea, Phlomis, etc.  
  
In the republic the Shiblyak vegetation occupies small areas, as compared to Phrygana. Well-preserved are in some places of the Nakhchivan Autonomy such representatives of the Shiblyak as communities formed by Paliurus spina-christi, Rhamnus pallasii, Cotoneaster racemiflora, Amygdalus fenzliana, Caragana grandiflora, Spiraea crenata, etc. Those formations are represented well in mountainous xerophytic vegetation. The formations of Pistacia mutica, Juniperus, Cotinus, Celtis, etc. are also typical of the republic and create particular communities.  
   
In the arid Eldar Oyugu range located in the northwest of Azerbaijan there is an isolated spot of typical thin forest formed by Pinus eldarica, which is an endemic relict of the tertiary period. The natural thin forest includes such higher plant species as juniper, pistachio, Paliurus spina-christi and 30-35 others. These communities obviously belong to the mountainous xerophytic type.  
  
Along the major rivers (Kura, Araz, Ganikh, Gabirri) as narrow interrupted lines stretched are Tugai forests with southern willows, mulberry trees, elms, pomegranates, hybrid-type poplars, Elaeagnus, Tamarix, etc. A considerable number of shrubs sometimes form a mixed forest along the banks of mountainous rivers or in river valleys, e. g. Hippophae rhamnoides, Elaeagnus, willows (Salix), Rhus coriaria, Tamarix, mulberries, pomegranates, wild roses, blackberries, etc. Hippophae rhamnoides is most widely spread in the valleys of the Shin, Kish, Damiraparan, Turyan, Geychay, Agsu, Velvele and Terter rivers. Along the rivers of Talysh grow Pterocarya pterocarpa and Alnus subcordata, sometimes forming considerable plantations. Another species of alder, Alnus barbata, is typical of boggy woods in Talysh. In the coastal forests of Talysh typical are local endemic species of fig (Ficus hyrcanica), Humulus lupulus, Smilax excelsa, Sambucus ebulus, Carex of many species, Cardamine, Poa, etc. In the marshes the species of Juncus form the marshy communities of Juncetum.  
  
Local-type lowland forests can be found in Guba-Khachmas and Karabakh and also in the Alazan-Ayrichay valley. They mainly include such trees and shrubs as Quercus longipes, Ulmus, Crataegus sp. div., Mespillus germanica, etc. The Alazan-Ayrichay valley forest also includes Acer velutinum, Tilia caucasica, Fraxinus excelsior, Pyrus caucasica and several other trees and shrubs. Here occur such creeping plants as Smilax excelsa, Hedera helix, Clematis vitalba, Vitis silvestris. There are various forms of the long-stalk oak (Quercus longipes) in the lowland forests.  
  
As for the lowland forests of Talysh, Parrotia persica and Quercus castaneifolia are the most typical species of trees there. Besides those relict species, the Talysh lowland forests are rich in Carpinus caucasica, Zelkova carpinifolia, Zelkova hyrcana, Ulmus elliptica, Prunus caspica, Populus hyrcana. At the lower layer of the wood occur the evergreen shrubs of Ruscus hyrcana and Danae racemosa.  
  
The Caucasian persimmon (Diospyrus lotus) forms groves usually on more shadowy and humid hillsides. Gleditschia caspica is the major species of tree in Talysh. It forms autonomous forests in the Talysh foothills, with Albizzia julibrissin, Tilia and others admixed to them on the hillsides facing the sea. At somewhat higher level above the sea Acer velutinum occurs, and Fagus orientalis occurs on the northern hillsides, forming high forests. Taxus baccata, box trees (Buxus) and Danae form the lower layer of the wood.  
  
In the Great and Minor Caucasus Mountains broad-leaved forests occur at 600-1,800 meters above sea level. Quercus iberica, Fagus orientalis and, in the higher zones, Quercus macranthera are the main species there. Fagetum is a very productive forest rich in species. Besides beeches (Fagus) and oaks (Quercus), there are lime trees (Tilia), hornbeams (Carpinus), 5-6 species of maples (Acer), and especially Acer trautvetteri growing together with the Eastern oak (Quercus macranthera). No grass cover can normally develop in thick beech forests, but if they are lighter to a certain extent, then shrubs and grasses grow. E. g., holly, ferns, blackberries, Rhododendron, Sambucus, Fragaria vesca and numerous cereals are spread in the lower layer of the wood. Quercus iberica and Carpinus caucasicus form a wide strip in the medium mountain belt, with rowan trees (Sorbus) widely spread.  
  
In the alpine belt (1,800-2,000 meters) Quercus iberica is replaced by Quercus macranthera, which forms forests of park type. In this belt there are also sub-alpine meadows and high grasses located close to park-type forests. Quercus macranthera, Betula litwinowii, Betula pendula, Acer trautvetteri are spread on the sides of high mountains, forming woods there. Birch (Betula) trees are often stooped on the northern slopes because of snowy avalanches. The Caucasian rowan tree (Sorbus caucasigena) is typical in thin forests.

Among the conifers two species of pine trees (Pinus eldarica and Pinus kochiana) are spread in Azerbaijan. Pinus eldarica occurs on the Steppe Plateau at 600 m above sea level, while Pinus kochiana occurs at 1,600 m above sea level in the region of Gyok-Gyol (the Minor Caucasus) and in the medium mountain belt in the Bulanig river valley of the Belokan region in the Great Caucasus. Pinus kochiana and birch trees form mixed groves on the large rocks near Gyok-Gyol. Besides, such representatives of conifers as Taxus baccata occur in forests, and juniper species occur everywhere. Among the evergreen shrubs Rhododendron caucasicum forms small thickets in the sub-alpine belt of the northwest of the Great Caucasus, particularly in the Zakatala and Belokan districts.

At 1,800-3,200 m above sea level sub-alpine and alpine meadows and meadow-steppes are spread. True sub-alpine meadows include dozens of formations depending on the relief of the high mountains and the macroclimatic peculiarities. High grasses also create a peculiar formation in the sub-alpine zone, with the structure and composition being very various. High grasses and most of the sub-alpine plants are post-wood species. The high grasses mainly include Heracleum, Achillea, Cephalaria gigantea, Filipendula ulmaria, Calamagrostis arundinacea, Brachypodium silvaticum, Agrostis capillaris, Poa nemoralis, Koeleria gracilis, Vicia, Melilotus, clover (Trifolium), Verbascum, Aconitum, Delphinium, Dactylis glomerata, various species of the Rose family, etc. The sub-alpine belt includes more or less mesophytic meadows and drier meadow-steppes up to xerophytic formations. Those meadows include various species of cereals and clover, Geranium, Inula, Cephalaria, Scabiosa, Galium, Tragopogon, Betonica, Primula, Plantago, Rumex, Urtica, Cirsium, etc. Some 1,000 species are spread in sub-alpine meadows.  
  
The alpine belt vegetation is widely spread at 2,400 to 3,200 m above sea level and is represented by the elements of meadows and carpet grass. Vegetation is formed at these altitudes mainly on sloping hillsides, cupola-like peaks, mountain passes, saddles, etc. The alpine vegetation is not so rich in species as the sub-alpine vegetation, but it forms very bright and colorful meadows and carpets, which are of certain economic importance. The alpine vegetation of Azerbaijan is represented by two versions - alpine meadows and carpet grasses. Short-grass alpine meadows are represented by sedges, cereals, such as Carex, Festuca ovina, Zerna, Elyna, Kobresia, etc. Myosotis alpestris, Veronica gentianoides, Taraxacum stevenii, Trifolium ambiguum, Alchimilla caucasica, Potentilla, etc. are very frequent here. Meanwhile, carpet grasses also include two types of formations: 1) typical alpine carpet grasses on the fine earth substrate (caraway, Alchimilla, Plantago, etc.); and 2) stony carpet grasses on the stony substrate (Sibbaldiae, Campanulae, Macrotomiae).

Map

Description automatically generated

**Natural Reserves.**

These natural reserves are preserving the rare (sometimes endemic) tree species and therefore have a great role in preserving the natural fauna. Forests occupy 32% of Azerbaijan and all of them are well preserved.

State Reserves of Azerbaijan refers to the state reserves in Azerbaijan, which preserve the fauna, flora and their ecosystems.

State Reserves bear the status of governmental establishments aimed at environmental protection and scientific researches. They are particularly designed for the protection of typical and rare natural complexes and studying of natural processes and phenomena. The utilization of the lands of State natural reserves, as well as animals and plants, found within their boundaries for industrial purposes is prohibited by the law. Activities in this sector are regulated by the Ministry of Ecology and Natural Resources of Azerbaijan Republic.

In total more than 2,5% of Azerbaijan is under protection by the government as state reserve

There are 15 state natural parks in Azerbaijan to preserve and protect the fauna, flora and their ecosystems. See below for the list:

• Basut-Chay State Reserve

• Eldar Pine State Reserve

• Gara-Yaz State Reserve

• Gizil-Agach State Reserve

• Gobustan State Reserve

• Ilisu State Reserve

• Ismailli State Reserve

• Pirgulu State Reserve

• Shahbuz State Reserve

• Shirvan State Reserve

• Shusha State Historical and Architectural Reserve

• Turian-Chay State Reserve

• Qaragol State Reserve

• Zagatala State Reserve

**Basut-Chay State Reserve**

Basut-Chay State Reserve was established on the area of 1.07 km2 in 1974 for preserving and protecting the rare Oriental plane-tree. The reserve covers the area around the Basut-Chay of the southeastern part of Minor Caucasus.

Plane-trees

The plane-trees make up 93.5% of Basut-Chay State Reserve area. In average, plane-trees live for 170 years. However, one can come across the plane-trees 1200–1500 years of age, 50 meters in height and 4 meters in diameter.

The Basut-Chay State Reserve is under the control of de facto Nagorno-Karabakh forces and does not operate at present.

**Eldar Pine State Reserve**

The Eldar Pine State Reserve was established on the area of 16.86 km2 of Samuh administrative region on December 16, 2004. The reserve is mainly designed for preserving and protecting of rare and endemic species of Eldar Pine tree.

In 1967 the reserve (with the area of 3.92 km2 was transformed into the branch of Goy-Gol State Reserve.

**Gara-Yaz State Reserve**

Gara-Yaz State Reserve was established on the area of 48.55 km2 in 1978 for protecting and restoring of riparian woodlands around the Kur. It mainly protects rare and endangered tugai ecological systems, occupying the lands in the mid stream of the Kur. Riparian woodlands includes such types of trees as white poplar, oak, alder-tree and white acacia. Among sharp-clawed animals the most widely spread are wild boar and deer, among birds; pheasant, thrush, dove, etc.

The area of Gara-Yaz State Reserve was expanded by 48.03 km2 up to 96.58 km2 on June 2, 2003.

**Gizil-Agach State Reserve**

Gizil-Agach State Reserve was established on the area of 884 km2 south-west of the Caspian Sea shore for the purpose of protecting, creating conditions for wintering and nesting of migrant, swamp and wild birds in 1929.

The reserve was included of the list of UNESCO Ramseur convention "On internationally important swampy areas as the birds' residing places". The most species of birds included into the Red Book of Azerbaijan are found in the reserve and adjacent areas. The reserve accounts for 248 species of birds. Such mammals as wild boar, wolf, wild cat, badger, sable, fox, etc. populate this reserve. There are 54 fish species in the water basins of this reserve.

**Gobustan State Reserve**

Gobustan is amongst the most unusual places on Earth.Gobustan State Reserve was established in 1966 when the region was declared as a national historical landmark of Azerbaijan in an attempt to preserve the ancient carvings, mud volcanoes and gas-stones in the region.Gobustan State Reserve is very rich in archeological monuments, the reserve has more than 600,000 rock paintings, which depict primitive men, animals, battle-pieces, ritual dances, bullfights, boats with armed oarsmen, warriors with lances in their hands, camel caravans, pictures of sun and stars, on the average dating back to 5,000-20,000 years.

*Mud volcano in Gobustan.*

It's estimated that 300 of the planet's estimated 700 mud volcanoes sit in Gobustan, Azerbaijan and the Caspian Sea.[2] Many geologists as well as locals and international mud tourists trek to such places as the Firuz Crater, Gobustan, Salyan and end up happily covered in mud which is thought to have medicinal qualities.[3] In 2001 one mud volcano 15 kilometers from Baku made world headlines when it suddenly started spewing flames 15 meters high. [4]

*Gaval Dash*

The Gaval Dash is a natural musical stone which can only be found in Gobustan, Azerbaijan. Among the stone books there are a big flat stone formed out of 3 supports. Suffice it to touch the object with a small stone, melodious sounds come from it. The stone is called Gaval Dash, the sound can be compared with a tambourine. The Gaval Dash have been formed due to the unique climate, oil and gas which can be found in the region of Azerbaijan.

Today Gobustan is the most popular state reserve and is an invaluable treasure-house of Azerbaijan.

**Ilisu State Reserve**

Ilisu State Reserve was established on the area of 93 km2 in 1987. It aims to protect natural complexes of southern slopes of Major Caucasus, to preserve rare and endangered flora and fauna, to restore forests and prevent erosion of soil and flood. The reserve accounts for 500 plant species with nearly 60 species of endemic ones. One can come across such animals as roe deer, mountain buffalo, wild boar, squirrel, chamois, etc.

The territory of Ilisu State Reserve was expanded up to 173.816 km2 in March 2003.

**Ismailli State Reserve**

Ismailli State Reserve was established on the area of 57.78 km2 in 1981 for preservation and protection of natural complexes, occupying the north part of southern slope of Major Caucasus.

The area of the reserve was expanded by 109.6 km2 and brought to 167 km2 in June 2003.

Forests are mainly formed by such tree types as beech, hornbeam and oak, the small number of birch-tree, cud, lime-tree, etc. Among them are chestnut-leaved oak and horehound oak of the Tertiary period were included into the Red Book of Azerbaijan. The reserve accounts for nearly 170 animal species. 104 bird species of 13 orders are found in this reserve. Such mammals as brown bear, wild cat, lynx, Caucasian dear, roe dear, chamois, Caucasian goat, etc. populate the reserve.

**Pirgulu State Reserve**

Pirgulin reserve was created in 1968, the total area of which is 1500 hectares. The reserve has white maple, iron tree, loquat, cherry, walnut, ash, pear, apple, yew, white maple.

Pirgulu State Reserve was established on the area of 15.21 km2 in 1968 for protecting mountain forests, herbage of different kinds, fertile soil, expanding forest areas, preventing air pollution that has a negative impact on astroclimate. The flora of the reserve includes over 60 species.

The area of Pirgulu State Reserve was expanded by 27.53 km2 and reached 42.74 km2 in 2003.

**Shahbuz State Reserve**

Shahbuz State Reserve was created on the area of 31.39 km2 of Shahbuz administrative district of Nakhchivan (autonomous republic of Azerbaijan) by a decree of President of Azerbaijan on June 16, 2003. The area of Batabat lake is mainly surrounded by grassland. Medicinal herbs, oak trees etc. dominate the flora of the area.

It was established in June 2003 for the purpose of protecting rare and endangered species of plants and animals.

**Shirvan State Reserve**

Shirvan State Reserve was established on the area of 177.45 km2 of a part of Bendovan State Game reserve in 1969 for the purpose of protecting and increasing the number of water birds. The area of the reserve was expanded to 258 km2 in 1982. Water reserves account for 35,000 m2 of the area.

The largest part of the reserve was transferred to the Shirvan National Park in 2003 and the area of the reserve currently totals 62.32 km2.

Shirvan State Reserve composed 62.32 km2.

**Turian-Chay State Reserve**

Turian-Chay State Reserve was established on the area of 126.3 km2 in 1958 for the purposes of protection and restoration of arid forest complexes in Bozdagh and prevention of erosion processes in the mountainous slopes.

The reserve area was expanded to 225 km2 in January 2003. Three types of juniper (flavor, red and polycarpous), Georgian oak, cud, pomegranate, etc., can be found in the reserve.

**Gara-Gel State Reserve**

Gara-Gel State Reserve was established on the area of 2.4 km2 in 1987 for protection and preservation of rare ecological system of the lake of glacial origin and natural complexes surrounding the water basin. The lake feeds mainly from rains and spring water. The flora of the reserve comprises plants of 278 races, 68 breeds and over 100 species.

Gara-Gel State Reserve is occupied by Armenian forces and does not operate at present.

**Zagatala State Reserve**

The Zagatala reserve was created in 1929 and is located in the north-west of Azerbaijan. It has over 900 types of vegetation (plants)

Zagatala State Reserve was established in an area of 252 km2 of Zagatala and Balakan districts in the central part of southern slopes of the Caucasus; in Azerbaijan.

The territory of the reserve has been altered for several times and gradually reached 238 km2. The reserve aims to protect Sub-Alpine plants of southern slopes of the Major Caucasus and the natural complexes of Alpine and nival zones. The reserve is famous for such ancient plants as rhododendron, cherry-laurel, blackberry, maple, fern, etc.

In 2005-2006 there were suggestions to expand the reserve territory of the Zagatala State Reserve. The Ministry of Ecology and Natural Resources had announced that they had confirmed to expand Zagatala State Reserve in 2007.

**Altiaghac reserve**

It was established on August 31, 2004 and covers an impressive 11,035 hectares.

Altyagadzh National Park is located on the territory of two districts: Khizi and Siyazan, in the north-east of the country.Altiaghac reserve is located in the northeast of Azerbaijan. It is one of the biggest reserves in Azerbaijan and is 11 035 hectares. It is covered with deciduous forests, where the main types of trees are Caucasian oak, Caucasian hornbeam, oriental beech, ash and birch and commonly you can meet are most common thorny hawthorn, wild rose and blackberry bushes.

**Goygol**

Goygol reserve was created in 2008. It’s located on the slope of Kapaz mountain, at 1000–3600 meters above the sea.

Th reserve was created to preserve a rich vegetative cover (over 80 types of trees and bushes) and bio media.

**Girkan reserve**

The Girkan reserve was created in 2004 and is 42 797 hectares. From vegetation, there are over 1900 flora species. This includes 162 endemic, 95 rare, 38 endangered species. Among those, some of the species are listed in the Red book, for example, Girkan boxwood, ironwood, chestnut-leaf oak, figs, Girkan pear, Lankaran albition, Caucasian persimmon, alder, and others.

**National Parks**

As a country located in the Caucasus between the Black and Caspian Seas, Azerbaijan has a rich flora and fauna and widest biodiversity among the European states and enormous natural resources. The lands with specially protected ecosystems play the crucial roles in biodiversity preservation. The activity of such natural bodies promotes the preservation of rare and endangered species of plants and animals. Azerbaijan has a total of 9 national parks (as well as 13 state natural parks and 21 state reserves), which are listed in the table with the year of their establishment and their surface area.

The total surface area of the 10 national parks is 421,366.4 hectares (4,213.664 km2; 1,626.905 sq mi). In total more than 4,9% of Azerbaijan is under protection by the government as national parks.

| **National Park** | **Date of establishment** | **Surface area (ha)** | **Surface area (km2)** | **Surface area (square miles)** | **Map** |
| --- | --- | --- | --- | --- | --- |
| [Absheron National Park](https://en.wikipedia.org/wiki/Absheron_National_Park) | February 8, 2005 | 783 | 7.83 | 3.02 | [National parks of Azerbaijan is located in Azerbaijan](https://en.wikipedia.org/wiki/File:Azerbaijan_adm_location_map.svg)  National parks of Azerbaijan |
| [Ag-Gel National Park](https://en.wikipedia.org/wiki/Ag-Gel_National_Park) | July 5, 2003 | 17,924 | 179.24 | 69.20 | [National parks of Azerbaijan is located in Azerbaijan](https://en.wikipedia.org/wiki/File:Azerbaijan_adm_location_map.svg)  National parks of Azerbaijan |
| [Altyaghach National Park](https://en.wikipedia.org/wiki/Altyaghach_National_Park) | August 31, 2004 | 11,035 | 110.35 | 42.61 | [National parks of Azerbaijan is located in Azerbaijan](https://en.wikipedia.org/wiki/File:Azerbaijan_adm_location_map.svg)  National parks of Azerbaijan |
| [Gizilaghaj National Park](https://en.wikipedia.org/w/index.php?title=Gizilaghaj_National_Park&action=edit&redlink=1) | September 26, 2018 | 99,060.0 | 990.600 | 382.473 | [National parks of Azerbaijan is located in Azerbaijan](https://en.wikipedia.org/wiki/File:Azerbaijan_adm_location_map.svg)  National parks of Azerbaijan |
| [Göygöl National Park](https://en.wikipedia.org/wiki/G%C3%B6yg%C3%B6l_National_Park) | April 1, 2008 | 12,755 | 127.55 | 49.25 | [National parks of Azerbaijan is located in Azerbaijan](https://en.wikipedia.org/wiki/File:Azerbaijan_adm_location_map.svg)  National parks of Azerbaijan |
| [Hirkan National Park](https://en.wikipedia.org/wiki/Hirkan_National_Park) | February 9, 2004 (enlarged on April 23, 2008) | 40,358 | 403.58 | 155.82 | [National parks of Azerbaijan is located in Azerbaijan](https://en.wikipedia.org/wiki/File:Azerbaijan_adm_location_map.svg)  National parks of Azerbaijan |
| [Samur-Yalama National Park](https://en.wikipedia.org/wiki/Samur-Yalama_National_Park) | November 5, 2012 | 11,772 | 117.72 | 45.45 | [National parks of Azerbaijan is located in Azerbaijan](https://en.wikipedia.org/wiki/File:Azerbaijan_adm_location_map.svg)  National parks of Azerbaijan |
| [Shahdag National Park](https://en.wikipedia.org/wiki/Shahdag_National_Park) | December 8, 2006 (enlarged on July 5, 2010) | 115,900 | 1,159 | 447 | [National parks of Azerbaijan is located in Azerbaijan](https://en.wikipedia.org/wiki/File:Azerbaijan_adm_location_map.svg)  National parks of Azerbaijan |
| [Shirvan National Park](https://en.wikipedia.org/wiki/Shirvan_National_Park) | July 5, 2003 | 54,373.5 | 543.735 | 209.937 | [National parks of Azerbaijan is located in Azerbaijan](https://en.wikipedia.org/wiki/File:Azerbaijan_adm_location_map.svg)  National parks of Azerbaijan |
| [Zangezur National Park](https://en.wikipedia.org/wiki/Zangezur_National_Park) | June 16, 2003 (expanded on November 23, 2009) | 42,797 | 427.97 | 165.24 | [National parks of Azerbaijan is located in Azerbaijan](https://en.wikipedia.org/wiki/File:Azerbaijan_adm_location_map.svg)  National parks of Azerbaijan |

**Hirkan National Park**

Hirkan National Park is located in the Lenkoran Lowland and the Talysh Mountains, and is 99% covered by forests in a primarily mountainous region, and is strictly protected.

Hirkan National Park preserves relict and endemic plants species of Tertiary period. Forests of Hirkan account for 150 out of 435 types of trees and bushes. One can come across such types of trees, included into the Red Book of Azerbaijan as, Hirkan box tree, iron tree, chestnut leave oak, fig-tree, Hirkan pear-tree, Silk Acacia, Caucasus palm-tree, Caspian gleditsia, butcher's broom, alder-tree.

**Altyaghach National Park**

The area of Altyaghach is 90.5% covered by temperate deciduous broadleaved forests. The major types of trees are iron trees, Caucasus hornbeam, Oriental beech, cud, birch-tree, etc.

Absheron National Park

The predecessor of Absheron National Park during Soviet times was the Absheron State Nature Preserve which was created in July 1969 in order to protect gazelle, Caspian seal and water birds inhabited in the territory. The climate of the area is mild-hot, specific to semi-desert and dry steppe. Types and phytomass of flora is too poor here, plants are changed respective of water and saltiness regime of area. Sea coastal sand plants (42,6%), meadows with jigilgamish and paz grass (13,2%), one-year saline grasses (5,2%) etc. are spread.

**Shahdag National Park**

The Shakhdag National Park was created in 2006, and became the largest national park not only Azerbaijan but in the whole Caucasus.

The Shahdag National Park is located in northern Azerbaijan, on the border with Russia and Georgia at the Greater Caucasus Mountains. The World Bank has allocated a $17 million loan and $8 million grant for the national park's creation, while the government of Japan has provided $8 million as a grant for the project implementation. Shahdag National Park will help address ecological issues and build a tourist infrastructure in the Caucasus for visitors

**Göygöl National Park**

The Göygöl National Park was created in 2008. The predecessor of Göygöl National Park during Soviet times was the "Goy Gol State Reserve" that was established in 1925. The Göygöl National Park is located in eastern Azerbaijan, on the northern slopes of the Lesser Caucasus and includes Lake Göygöl after which it is named. The area of Göygöl is almost entirely covered by forests and has a rich flora with over 420 plant species, including 20 which are endemic to the area.

Forests at an altitude of 1,100 - 2,200 meters above sea level include 80 species of trees and shrubs.

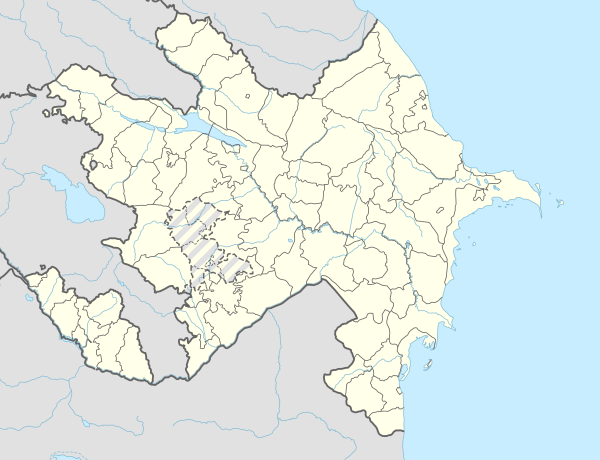
The right tributary of the Kurekchay River - Akhsuchay flows through the park.

**Samur-Yalama National Park**

The Samur-Yalama National Park was created in 2012. The major part of the national park is in the Caspian coastal zone and is covered with forests. The types of habitats include the littoral zone, forest, bush and steppe.

Gizilaghaj National Park

The Gizilaghaj National Park was created in 2018 and is currently the newest national park of Azerbaijan.



**Ethnobotany**

Around the world, different cultures have developed their own ethnobotany systems, making use of their indigenous plants based on long-term empirical observations. Humans discovered the value of plants as agents for health promotion, disease prevention, and medicinal uses. In addition to offering nutritional value and the potential for development of new drugs, plants also offer extensive phytonutrients that provide health benefits. Regarding folkloric food consumption patterns, “treatment” and “prevention” concepts are greatly intertwined when we are referring to dietary herbs. In addition to nutritious herbal foods, traditional medicinal foods are made from dietary plants that can be used either as a single, or combined herbal formulation in various processed forms and preparations. This chapter looks at the main dietary phytonutrients and some of their main sources in brief. Important dietary plants will be introduced, and the traditional use of them as food or medicine in different regions of the world will be reviewed.

Ethnobotany is the study of interrelations between humans and plants; however, current use of the term implies the study of indigenous or traditional knowledge of plants. It involves the indigenous knowledge of plant classification, cultivation, and use as food, medicine and shelter. Although most of the early ethnobotanists studied plant used in cultures other than their own, the term ethnobotany does not necessarily mean the study of how ‘other’ people use plants. It is also not restricted to the study of medicinal plants by indigenous cultures. The use of ethnobotany in plant selection entails a careful recording of the relationship between indigenous communities and plants. It is a very complex undertaking that often requires collaboration of experts drawn from various disciplines such as anthropology, botany, ecology, pharmacy, linguistics, medicine and ethnography. Ethnobotany has now emerged as a discipline by itself that studies all types of interrelations between people and plants. As Ford15 noted: ‘ethnobotany lacks a unifying theory but it does have a common discourse’. The central theme is the recognition of the reciprocal and dynamic nature of the relationship between humans and plants.16 There are excellent publications available on the general introduction to the protocols and ethical issues concerning ethnobotanical work.16,20–22

Ethnobotany has a very long history dating back to the Biblical Old Testament times.1 With the developments in modern science, a number of drugs owe their discovery and development to ethnobotany. Some examples are aspirin (acetylsalicylic acid) originally derived from the willow tree, Salixspp. (Salicaceae) used in Europe, reserpine from the Indian medicinal use of Rauwolfia spp., Afzel. (Apocynaceae), quininefrom the South American Cinchona spp. (Rubiaceae), and eserine(Physostigmin) from the African use of the plant Physostigma venenosum Balfour (Pipilionaceae) in Nigeria. Just recently, artemisinin, an antimalarial, has been developed from the Chinese herbal medicine Quinghaosu.

It has been established that up to 25% of the drugs prescribed in conventional medicine are related directly or indirectly to naturally occurring substances mostly of plant origin. This contribution is a credit to ethnobotany in drug discovery. Natural products from plants, microbes and animals contribute to about half of the pharmaceuticals in use today.3,4 Farnsworth5has shown that 119 drugs of known chemicals in medical use arose from less than 90 plant species.

Ethnobotany contributes to drug discovery by providing leads to:

1.Direct drug substances first isolated from nature as with reserpine6 and eserine.7,8

2.Drug substances that have low desirable biological activities or have desired drug activities but with undesirable side-effects. Through modification of chemical structure by derivatization or synthesis of the same or similar chemical structures, drugs having the desired properties may be developed. Quinine9 and chloroquine10 illustrate this point.

3.Excipients in the formulation of drugs,11 for example, gum arabic from the plant Acacia verek Guill. & Peir (Mimosaceae).

4.Raw materials for drug synthesis: Diosgenin from Dioscorea composita Hemsl. and D. terpinapensis Uline (Dioscoreaceae) serve as raw materials for the synthesis of steroidal drugs.12

These results have arisen in spite of the several known limitations of ethnobotany and the usually associated ethnomedicine. The limitations of herbal drugs derived from ethnobotany revolve around standardization, quality control, dosage and the common tendency to describe diseases and ailments vaguely. Standardization problems arise because constituents of the same plant may vary according to soil types, weather, time of the year and time of the day. Furthermore, plants may be wrongly identified, recipes may contain many components, and preparations may be unstable. Reasons such as these have necessitated the application of techniques in botany, chemistry, molecular biology along with pharmacology, toxicology and clinical medicine to drug development from ethnobotany.

## Ethnobotany is the study of a region's plants and their practical uses through the traditional knowledgeof a local culture and people. An ethnobotanist thus strives to document the local customs involving the practical uses of local flora for many aspects of life, such as plants as medicines, foods, intoxicants and clothing.Richard Evans Schultes, often referred to as the "father of ethnobotany",explained the discipline in this way:

## Ethnobotany simply means ... investigating plants used by societies in various parts of the world.

## Since the time of Schultes, the field of ethnobotany has grown from simply acquiring ethnobotanical knowledge to that of applying it to a modern society, primarily in the form of pharmaceuticals. Intellectual property rights and benefit-sharing arrangements are important issues in ethnobotany.

## HISTORY

## The idea of ethnobotany was first proposed by the early 20th century botanist John William Harshberger. While Harshberger did perform ethnobotanical research extensively, including in areas such as North Africa, Mexico, Scandinavia, and Pennsylvania, it was not until Richard Evans Schultes began his trips into the Amazon that ethnobotany become a more well known science. However, the practice of ethnobotany is thought to have much earlier origins in the first century AD when a Greek physician by the name of Pedanius Dioscorides wrote an extensive botanical text detailing the medical and culinary properties of "over 600 mediterranean plants" named De Materia Medica. Historians note that Dioscorides wrote about traveling often throughout the Roman empire, including regions such as "Greece, Crete, Egypt, and Petra",and in doing so obtained substantial knowledge about the local plants and their useful properties. European botanical knowledge drastically expanded once the New World was discovered due to ethnobotany. This expansion in knowledge can primarily be attributed to the substantial influx of new plants from the Americas, including crops such as potatoes, peanuts, avocados, and tomatoes. The French explorer Jacques Cartier learned a cure for scurvy (a tea made from the needles of a coniferous tree, likely spruce) from a local Iroquois tribe.

## Medieval and Renaissance

## During the medieval period, ethnobotanical studies were commonly found connected with monasticism. Notable at this time was Hildegard von Bingen. However, most botanical knowledge was kept in gardens such as physic gardens attached to hospitals and religious buildings. It was thought of in practical use terms for culinary and medical purposes and the ethnographic element was not studied as a modern anthropologist might approach ethnobotany today.

**Development and application in modern science**

The first individual to study the emic perspective of the plant world was a German physician working in Sarajevo at the end of the 19th century: Leopold Glück. His published work on traditional medical uses of plants done by rural people in Bosnia (1896) has to be considered the first modern ethnobotanical work.

Other scholars analyzed uses of plants under an indigenous/local perspective in the 20th century: Matilda Coxe Stevenson, Zuni plants (1915); Frank Cushing, Zuni foods (1920); Keewaydinoquay Peschel, Anishinaabe fungi (1998), and the team approach of Wilfred Robbins, John Peabody Harrington, and Barbara Freire-Marreco, Tewa pueblo plants (1916).

In the beginning, ethonobotanical specimens and studies were not very reliable and sometimes not helpful. This is because the botanists and the anthropologists did not always collaborate in their work. The botanists focused on identifying species and how the plants were used instead of concentrating upon how plants fit into people's lives. On the other hand, anthropologists were interested in the cultural role of plants and treated other scientific aspects superficially. In the early 20th century, botanists and anthropologists better collaborated and the collection of reliable, detailed cross-disciplinary data began.

Beginning in the 20th century, the field of ethnobotany experienced a shift from the raw compilation of data to a greater methodological and conceptual reorientation. This is also the beginning of academic ethnobotany. The so-called "father" of this discipline is Richard Evans Schultes, even though he did not actually coin the term "ethnobotany". Today the field of ethnobotany requires a variety of skills: botanical training for the identification and preservation of plant specimens; anthropological training to understand the cultural concepts around the perception of plants; linguistic training, at least enough to transcribe local terms and understand native morphology, syntax, and semantics.

Mark Plotkin, who studied at Harvard University, the Yale School of Forestry and Tufts University, has contributed a number of books on ethnobotany. He completed a handbook for the Tirio people of Suriname detailing their medicinal plants; Tales of a Shaman's Apprentice (1994); The Shaman's Apprentice, a children's book with Lynne Cherry (1998); and Medicine Quest: In Search of Nature's Healing Secrets (2000).

Plotkin was interviewed in 1998 by South American Explorer magazine, just after the release of Tales of a Shaman's Apprentice and the IMAX movie Amazonia. In the book, he stated that he saw wisdom in both traditional and Western forms of medicine:

No medical system has all the answers—no shaman that I've worked with has the equivalent of a polio vaccine and no dermatologist that I've been to could cure a fungal infection as effectively (and inexpensively) as some of my Amazonian mentors. It shouldn't be the doctor versus the witch doctor. It should be the best aspects of all medical systems (ayurvedic, herbalism, homeopathic, and so on) combined in a way which makes health care more effective and more affordable for all.

A great deal of information about the traditional uses of plants is still intact with tribal peoples. But the native healers are often reluctant to accurately share their knowledge to outsiders. Schultes actually apprenticed himself to an Amazonian shaman, which involves a long-term commitment and genuine relationship. In Wind in the Blood: Mayan Healing & Chinese Medicine by Garcia et al. the visiting acupuncturists were able to access levels of Mayan medicine that anthropologists could not because they had something to share in exchange. Cherokee medicine priest David Winston describes how his uncle would invent nonsense to satisfy visiting anthropologists.

Another scholar, James W. Herrick, who studied under ethnologist William N. Fenton, in his work Iroquois Medical Ethnobotany (1995) with Dean R. Snow (editor), professor of Anthropology at Penn State, explains that understanding herbal medicines in traditional Iroquois cultures is rooted in a strong and ancient cosmological belief system. Their work provides perceptions and conceptions of illness and imbalances which can manifest in physical forms from benign maladies to serious diseases. It also includes a large compilation of Herrick’s field work from numerous Iroquois authorities of over 450 names, uses, and preparations of plants for various ailments. Traditional Iroquois practitioners had (and have) a sophisticated perspective on the plant world that contrast strikingly with that of modern medical science. Researcher Cassandra Quave at Emory University has used ethnobotany to address the problems that arise from antibiotic resistance. Quave notes that the advantage of medical ethnobotany over Western medicine rests in the difference in mechanism. For example, elmleaf blackberry extract focuses instead on the prevention of bacterial collaboration as opposed to directly exterminating them.

**Ethnopharmacology** is the study of ethnic groups and their health, how their health is related to their lifestyle and their use of drugs - both traditional and pharmaceutical, - is the drug specific to the area in which the group lives, and how for a long time this medicine has been in use by this group. The term "ethnopharmacology" was first introduced in 1967 in the study of hallucinogenic plants. It is grouped under the broader branch of ethnopharmacy, which looks at both the perception and use of traditional medicine in society. Ethnopharmacology attracts a wide range of scientists from different specialties.

This pharmacology is related to science - it is ethnobotany, the study of how different cultures use medicinal plants, in particular. In recent years, ethnopharmacology has become more and more popular as more and more studies confirm the beneficial effects of plants on human health. The progressive development of pharmacognosy, the study of medicines obtained from natural sources, provided serious scientific support for further research on the medicinal properties of plants. New drugs are discovered as a result of studying ethnopharmacology. Many common drugs used in modern society come at least in part from natural sources.