

THE NECESSITY OF PRESERVING AND REGENERATING CARPATHIAN JUNIPER TREES

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ABSTRACT. In the east of its spreading area, and therefore in the Carpathians, the juniper is a shrub that rarely reaches 3 m high (more often it reaches 2 meters) being a creeping plant with numerous short stems, branched at the base and having the pointed branches up. The elasticity of stems and branches leads to the retention of a large amount of snow, which produces the most effective snow-slide prevention. The juniper plays an important role in maintaining the hydrological balance of the mountainous and subalpine areas of the Carpathians of Romania. Measurements have shown that one hectare of juniper retains in the adjacent soil on average half of the amount of precipitation each year. The rest of the fallen water returns to the atmosphere in the form of vapors through the process of evapo-sweating, contributing to the establishment of a wet and cool microclimate, characteristic of the mountain. Water stored in the turbid soils of the juniper continuously supplies the groundwater, so that springs and streams in the area flow constantly throughout the year. Known as the role of juniper in the general economy of nature, especially in maintaining a healthy hydrological balance in the mountainous and subalpine areas, we must intervene for the preservation and regeneration of the juniper in the Carpathians.

Keywords: juniper tree, Carpathian, hydrological balance, snow-slide prevention.

REZUMAT. Necesitatea conservării și regenerării jnepenişurilor din Carpați. În estul zonei sale de răspândire, deci și în Carpați, jneapănul este un arbust care rar atinge 3 m înălțime (frecvent atinge 2 metri) fiind o plantă cu port târător, cu numeroase tulpini scunde, ramificate la bază și având vârful ramurilor îndreptate în sus. Elasticitatea tulpinilor și a ramurilor duce la retenția unei mari cantități de zăpadă, ceea ce produce cea mai eficientă prevenire a avalanșelor. Jneapănul și jnepenişurile au un rol important în menținerea echilibrului hidrologic al zonelor montană și subalpină din Carpații României. Măsurătorile au demonstrat că un hectar de jneapăn reține în solul sub adiacent, în medie, jumătate din cantitatea de precipitații căzute anual. Restul apei căzute se întoarce în atmosferă sub formă de vapori prin procesul de evapo-transpirație, contribuind la instaurarea unui microclimat umed și răcoros, caracteristic muntelui. Apa înmagazinată în solul turbos al jnepenişului aprovizionează continuu pânza freatică, impunând prin aceasta izvoarelor și pâraielor din zonă un debit constant în tot cursul anului. Cunoscut fiindu-ne rolul jneapănului în economia generală a naturii, îndeosebi în menținerea unui echilibru hidric sănătos în zonele montană și subalpină, trebuie intervenit pentru conservarea și regenerarea jneapănului în Carpați.

Cuvinte cheie: jneapăn, Carpați, balanța hidrică, prevenirea avalanșelor.

INTRODUCTION

At the end of the last glaciation, juniper (*Pinus mugo* Turra) had a wide spread, but with the warming of the climate, its area became fragmented. Current populations are billeted on the subalpine floor of the Pyrenees, the Alps, the Carpathians and the Balkans, or sometimes in bogs, at lower altitudes, as relict witnesses of the former area.

In the east of its spreading area, and therefore in the Carpathians, the juniper is a shrub that rarely reaches 3 m high (often it reaches 2 meters) being a creeping plant with numerous short stems, branched at the base and having the pointed branches up. The elasticity of stems and branches leads to the retention of a large amount of snow, which produces the most effective snow-slide prevention. The juniper plays an important role in maintaining the hydrological balance of the mountainous and subalpine areas of the Carpathians of Romania.

MATERIAL AND METHOD

In the mountains of Western Europe there are juniper populations where specimens are trees that can reach 26 meters high, these plants being considered as belonging to the alpine vicariance (*Pinus uncinata* Ramond ex DC.), and the creeping juniper (*Pinus mugo* Turra) is mentioned as being present in the Eastern Alps, but having the optimal climate in the Carpathians and the Balkans. Even at us there are arborescent junipers on the valley of Sălanelor (Sebeș Mountains). "Between the two vicariates interconnect a large interfering zone, with the gradual passage of the arborescent populations to the creeping, with their passage from the west to the east" (Boșcaiu, 1975).

RESULTS AND DISCUSSIONS

Juniper trees are found in areas where the snow layer is present for 80-160 days a year, so that the 5 to 6 month period of vegetation per year offers a growth and maturation period of up to 3-4 months per year (Soran et al., 1985). The elasticity of the stems offers a great deal of resistance against snow-slides, blizzards and thick snow layers. Porous snow, containing a large volume of air that acts as a thermal insulator, has an important protective role over very low temperatures. Juniper trees are a defense system against snow-slides, protecting the forest, limiting the possibility of torrents and erosion of the soil and contributing to the creation of a uniform water flow of the springs.

In terms of soil conditions, juniper is a less demanding species. It is widely spread on primary podzols, but it can also be found on poorly developed skeletal soils on poor soils in mineral substances, usually very acidic, with pH between 3 and 5, on grooves lacking the soil layer and even on the peat bog. In the folds, its branches are interwoven, which makes them difficult to penetrate. Sometimes, the branches are so tightly tied together that they form a strong reinforcement, which is

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extremely important in preventing soil erosion, landslides and snow-slides. Approximate calculations require a period of 100-400 years for the formation of a soil layer of 1 cm thickness, and by the destruction of the juniper, the soil layer is washed by the surface waters for 1-2 years. So, just one or two years after the destruction of the juniper, a soil for the formation of which was needed over 2,000 years disappear.

The juniper, unlike spruce and smoke, has a more significant increase in biomass in dry and warm years, but excessive years of drought and warm weather already have a negative influence, just like the cold and rainy years.

Until the beginning of the nineteenth century, the high peaks of our mountains were still too scarcely traveled by the pastoral population. This circumstance was also due to the preservation of the alpine flora in full authenticity, until the middle of the last century. In particular, the development of zoo-culture, at a time when pratology was not yet established as a science, had the effect of degrading the fodder of most meadows. Within a short time of their use, under the effect of an abusive stress, overloading pastures, natural grasslands in high areas have degraded in a vertiginous way both in quantitative and qualitative terms. As a result of these degradations, the unreasonable practice of expanding secondary meadows has emerged through the uncontrolled deforestation of rarities and especially of juniper, whose reserves in the Carpathians seemed to be inexhaustible. Juniper trees were regarded by ignorant shepherds as useless bush that invaded an ancient pastoral heritage. The action of extending the meadows through the uncontrolled destruction of the juniper, took an excessive scale over the whole Carpathians. On the desolate monotony of the bare expanse of these mountains, sporo palynological analysis - even of the most superficial soils - attests to the late disappearance of juniper. "The main way by which deforestation was executed was the incendiary, and the chances of its success were much greater in the dry and warm years" (Soran et al., 1985). We would be trying to find the multicolored grasslands that Kotschy was so enthusiastic about today! (Boşcaiu, 1975).

The invasion of domesticated herds on the surfaces of alpine and subalpine pastures in the Carpathians is relatively recent. "Under the action of subalpine and alpine grazing, the size of which grew particularly in the late 19th century and in the early decades of the 20th century, ecosystems of major importance were also sacrificed. We refer in particular to juniper, whose deforestation by arson and cutting has become a common practice, often recommended and encouraged by the authorities. Especially on the steep slopes and especially in the area of torrents, the deforestation of the juniper had the most unfavorable consequences for both pastoral and forestry economies" (Cernelea, 1975).

"We will encounter the difficulties of categorically distinguishing the alpine and subalpine floors. The 'mountain ridge', which includes the meadows outside the current forest perimeters, has become a physiognomic notion that tends to dissolve in a confused amalgam the distinction between the alpine and subalpine floors. The expansion of the 'mountain ridge' in an area whose membership can no

longer be spelled out in terms of climatic setting, suggests the magnitude and intensity of recent degradation of the alpine and subalpine landscape. The aforementioned explanation reveals the urgency of actions to establish in all Carpathian massifs of the perimeters that still carry authentic alpine groups, and to adopt measures for their preservation. Experience confirms that alpine vegetal groups are stenotype, being extremely fragile and unstable at changes in stationary conditions. In the Romanian Carpathians, the situation of these groups becomes even more critical in the face of zoo-anthropic pressure, as the highlighting of the alpine floor is considerably lower than in other mountain systems in Eurasia” (Boşcaiu, 1975).

In the current post-communist stage, with the general decline of grazing in the Carpathians, man-made grass pastures will be recaptured by subalpine shrubs, but climate change/global warming may lead to subalpine shrub vegetation to peaks, thus reducing space available for many species endemic cantons in alpine pastures on mountain peaks.

The juniper plays an important role in maintaining the hydrological balance of the mountainous and subalpine areas of the Carpathians of Romania. Measurements have shown that one hectare of juniper retains in the adjacent soil on average half of the amount of precipitation each year. The rest of the fallen water returns to the atmosphere in the form of vapors through the process of evapo-sweating, contributing to the establishment of a wet and cool microclimate, characteristic of the mountain. Water stored in the turbot soils of the juniper continuously supplies the groundwater, so that springs and streams in the area flow constantly throughout the year. There is another water balance after grubbing, especially on slopes with an inclination of more than 5-10 degrees. Shortly after cleansing the protective shrub, the turbot soil is thinner and disappears. The consequences are catastrophic. The grassy vegetation installed, the low-fodder and the other kind of soil, retains only about a fifth of the precipitations that fell during the year, most of the water draining in the form of torrents. They brace the soil, erode it, and eventually turn the mountain landscape into a barren area. Downstream, twin torrents increase their power in floods. Soiled and watered soil is deposited as sludge in the reservoir lakes, causing their gradual but irreversible clogging.

The long-term effects are readily anticipated: the groundwater is poor, the flow of springs and streams decreases, and some of them permanently sink. Microclimate suffers changes that are detrimental to the pastures in the area, in the sense that it becomes drier, making it easier to install harsh grasses despite any pastoral arrangements (Stancu, 2005).

The data of vegetation geography shows that at the end of the last century there were about two - three hundred thousand hectares of intact grassland in the Romanian Carpathians representing a potential reserve of about 100-150 million tons of water per year. Through the action of deforestation, carried out for several decades in a row, the area of the juniper fell to 60-100 thousand hectares, equivalent to a loss of our reserves of water of 70-100 million tones per year.

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The purpose of juniper trees in the upper spruce forest area are multiple. In winter, shrubs are a snow-stabilizing factor preventing the formation of avalanches and thereby the destruction of the spruce selva. If winter sports are practiced in the area, the presence of the juniper is a guarantee against the loss of human life through white death. Juniper, according to a former the great Romanian botanist the academician Nicolae Boşcaiu, is the most effective instrument the temperate mountain has invented to defend and keep its integrity unheeded over the millennia.

CONCLUSIONS

Known as the role of juniper in the general economy of nature, especially in maintaining a healthy hydrological balance in the mountainous and subalpine areas, we must intervene for the preservation and regeneration of the juniper in the Carpathians.

However, general measures on the protection of the natural environment cannot be achieved solely by administrative means. It is therefore necessary to inform and educate population both through the education network and through ecological education and training programs. Ecological education is considered "... the most important way, the most efficient means of nature preservation ..."

(Drăgulescu, 1995).

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