ON THE LOGG VEGETATION FROM THE BUCOVINA'S SUHARD MASSIVE

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Abstract

The Bucovina's Suhard massive is being known as a well forested area and at a general view the forestry vegetation of this mountainous seems monotone. The differences that emerge are as for the types of forests and for the productivity, the consequences are found at the the level of the environment's problems and those related to the local economy. In such conditions the analysis of the dynamics of the limits shows the human impact, decisive in the tracing and maintaining of them as in the near by sites and especially and at the peaks, in different economical conditions.

Key words: forest's limit, human pressure, forest's structure.

INTRODUCTION

The Bucovina's Suhard massive belongs, according to the Geography of Romania vol. III (Iacob,1987) to the northern part of the Oriental Carpathians called the Carpathian of Maramureş and Bucovina, been considered a south-east extension of the central crystalline massive (Rodna-Maramureş). To her research was offered a smaller attention in comparison with the interesting mountains of Rodnei, the strange mountains of Maramureş and the relatively high populated Obcine of Bucovina. In the studies with general character the Suhard is presented as an well wooded area, the geobotanical map from the geographic monography of R.P.R (1960) shows that this mountainous space belongs to the spruce forest (all the forestry groups in which predominates Picea abies, often without a mix of other woody species), and the Geography of Romania vol.III (Velcea, 1987) shortly presents the situation of the vegetation of Suhard, within the meaning of the forests that occupies proximate 4/5 of the surface, forests like wood with large productivity. Another category of studies are tilt over some aspects that lie of the assembly of North Oriental Carpathians, we can quote here Geanana (1972) who analyses the factors that contributes to the imposement of the superior limit of the forest in the Oriental Carpathians, without making any reference on the situation from Suhard, Doniţă et.al.(2005) in "Habitats from Romania" makes a review of the associations of living plants with some references also for Suhard, but with very wide broads what can lead to overdones like the existence here of an scarce forest of spruce and zâmbru. In the Geography of Romania vol.I (Popova-Cucu,

1983) it's made a fitogeographic farming of the Suhard area, and Popescu-Argeşel (1978) and (1983) highlights the overlap of the vegetation in the massive, a distinct aspect from those from the Obcina. The forests represent 76,7% from a total surface of 322,8 km^2 of the massive, according to the dates obtained based on the programme of filing the way of using the Corine fields at the level of the year 2000. It's about the bushy forests and vegetation from this and is retrived firstly at the level of the versants, but also the pitches and peaks are wooded, but without saying of an clear altitudinal overlap of the forests.

MATERIAL AND METHOD

In the realization of the analysis were used the topographic maps 1:25000 which covers the area of the massive, historical maps from the ICAS Bistrița and Câmpulung Moldovenesc archive. Statistic dates given by forest institutions from the area. In the making of the final image were processed the dates obtained in the program of chartering the way of using the Corine grounds at le level of the year 2000, at whom were added the personal field observations.

RESULTS AND DISCUSSIONS

The forest structure

The widest surface is represented by spruces (Piceetum Carpaticum), followed by a mixed association of spruce and beech (Piceetum-fagetum carpaticum). The conifer forests have a flowery composition quite uniforme with characteristic species: spruce *(Picea abies)*, fieldash *(Sorbus aucuparia)*, cuckoo's bread *(Oxalis acetosella)*, earth moss *(Sphagnum girgensohnii)*. In the east side of the massive where dates allow an efficacy accounting and the evidence of some conclusions, there is a forestry surface that counts 15 235 ha, proximate 47% from the extent of the massive with the types of forest giving in the lower chart:

Table 1

Eastern part of the Suhard Massif: types of forest.

Types of forests	Surface	Productivity	Discount rates (%)
Spruces with green muscules	2277	middle	14,9
Spuces with large altitude with Oxalis acetosella	799,1	middle	5,2
Spruces with Oxalis acetosella on scheletical soil	1307,8	middle	8,5
Normal spruces with Oxalis acetosella	5712	superior	37,4
Spruces with Vaccinium myrtillus and Oxalis acetosella	1785	middle	11,7
Limit spruces with Vaccinium	232,8	inferior	1,5

From the view of the production classes the situation is the following: 7123 ha (47%), the superior class 7307 ha (48%) the middle class and 806 ha (5,3%) the inferior class.

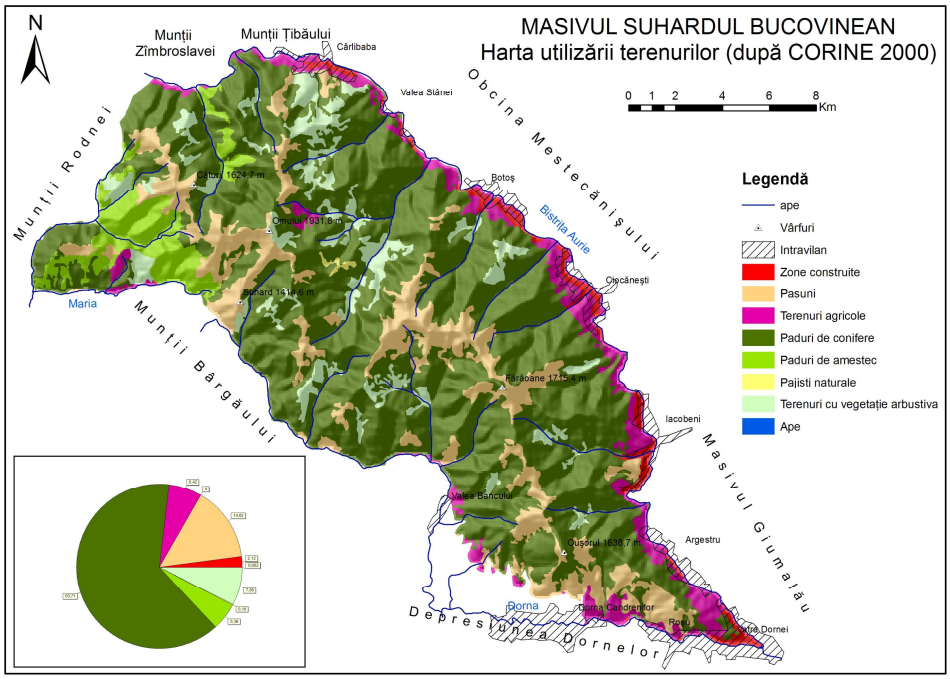

Fig. 1. Suhard: map of using land.

The dominant type of vegetation is represented by spruces, which forms an well represented overlap in the broadest side of the massive. They have the most currency from the foot of the massive (on the valleys and the hollows compartments), until the superior limit of the forest, respective from 800m to 1600m. The climatic conditions are characterized through annual average temperatures between 5 and 2^0C, annual average precipitations of 700-1000 mm, relatively high air humidity, all creating sizeably optimal conditions, from human causes, by appling some forestry measures throughout the time (Ichim, 1988). So, the lack of interest for the beech has made that this to be held back from breeding through mutilation, and then behind the carving erase, the forestry to be made only with spruce. The firo-spruces are extremely rare, the participation in the total weighting being extremely little. The fir is much more pretentious than the spruce, because he demands better conditions: more profound soils and richer in humus, but also higher temperatures and he avoids lower minimums. The most representatives are the blends of beech, fir and spruce. The beech goes

until 1200m, and in blend with spruce it reaches even 1400m. In the superior area of the mountains, above the forests limit of surroundings conditions the development of the forestry vegetation becomes less favourable, fact which lead to the arising of the overlap with subalpine character. In many situations even at more lower altitudes from the natural forest limit it can be observed the development of some trees with flag treetop and low productivity, having just a protection role, limit forests and a very low economical importance. In such conditions, even though the relief is favourable, upon them it will unreel an human pressure which, by the end, will determinate the install of the subalpine storey. In this way this storey was enlarged, proof being the decreasing of the upper forest limit to under 1600m. In the past the forest was filling almost the entire surface of the massive, outside of the areas watched at proximate 1800m. But by inches the man began to use the forests in his own interest valuing the wood initially for personal needs, then, more recently as item that brings income. In such conditions the attention was lead from the margin forests towards the inside once with the opening of some communication roads along the watery networks. Parallel to the superior side along of the main peak and the versants near by those forests there has been made by degrees place to the pasture, as a result to the human intervention. Thus the forest's limit was modified from the two directions and on their account the pastures and hays have been extended, a phenomenon which is unrolling even now through the cutting of the isolated trees or the tree bunches near by the limit of the pasture. At the level of OS Iacobeni from a total of 12167,7 ha forest, representing 37% from the mountain surface, it's shown that the largest part of the forests are situated between 1000 and 1400m (87%), only 12% is under 100m and under 1% are above 1400m.

The dynamic of the forest's limit

In the studies which are related to this problem it's assert that the superior limit of the forest in Oriental Carpathians doesn't pass in the majority of the cases by the altitude of 1750-1780m (Geanana, 1972). For the Rodnei Mountains, the author observes that it stops like a wall at 1730 m without being a limit for the forest. There are quotes as causes for this situation the slope mingled with the lack of the soil layer the exposure, the slope, the details of the forms of the relief, but also to the egg by the practicing of the pasturing. In the conditions where, certain it could go up until 1800-1850m. There are not excluded neither the climate conditions, the altitude first, which engraves the climate more continental touches with larger warming and by length larger in the summer and a large decrease of temperatures in the winter.

In the wider problem of the National Park of Rodnei (Kucsicsa, 2006), picks up the ideas of Geanana as for the superior natural limit of the forests and says that are stops at 1800-1850m, lower on the northern versant with proximate 100m, due to the exposition and the conditions more restrictive (stockpiles of detritus, sheers, day rock, and many more). He proving this with the height of the trees limit from the Rodnei Mountains beats 8-10m, which show an value of an human limit. In owner point of view, in the unreel of the analysis on the forest's limit from the Massive Suhard, we went from the field situation where, as in the Rodnei mountains, appears webbed, with significant advance through some valleys or certain versants with higher declension. Thereby, the limit is at 1625m on the eastern cheek of the Ouşoru peak, at 1530m on the Văcăria (Humor) book, at 1640m, on the main peak, at north from the Dieci peak, and in north, under the Omu peak, at 1740m on the right stream of the Rusaia brook.

On the south-west versant, the limit is at 1560m under the Coşorbii peak, at 1620m on the valley of the Măria Mare brook, under the Omu, at 1700m the springs of the Runc (Coşna) brook, at 1580m under the Icoana peak, 1620m under the Fărăoane peak, 1540m under the Ouşoru and Tarnița peak. It's about an average vertical throw of proximate 150-200m. The descend of the limit took place with priority in the past centuries, through the extinction of the subalpine pastures after the abolishment of the spruce forests.

The appearance of the areas covered with subalpine bushes around the Fărăoane, Runcu-Pietrele Roşii and Omu peaks leads us to the idea that the natural limit should be secured in attend to the altitudes on which the forest gets at this area, as long as the transition from a storey vegetation to the other is without a breaks. Or, in this context, it can't be taken higher than 1750m. It can be made the observation that in case of some sheltered versants, even with a wrong orientation the limit comes near the spoken altitude, as to the rest on the north-eastern versant the superior limit of the forests is at 1600-1700m. It results then a difference of proximate 50-100m, higher on the south-western versant, to the north-eastern. The best example as the abnormity of the upper forest's limit in the Suhard Massive it's retrieved along the main peak, in the area formed by the Runcu and Pietrele Roşii peaks, merged in the slide of an intersection back of the versants. Here, due to the larger slopes, the interest for a pastoral using of the field it's none, and due to the removal of the main valleys and the possibility of the wood exploitation is tickle. In such conditions is been offered to the viewer a perfect example, untainted, of transition from the forestry vegetation to the one with subalpine character, could it be an appreciated as the natural limit of the forest as it's diversity for the different versants

orientated: eastern respectively western. Thus on the western side the forest goes until at most 1700m, under the Runcu peak, up against those 1660m on the eastern side, under the Pietrele Roşii peak.

It can be made the name that the forests prefer the valleys line, even though this represents also the partial tracks of the avalanches, on the reasoning of an higher humidity and some soil conditions more favourable, while on the between-rivers areas always the limit descends quite a lot, it could have been quoted the cases up until 150m on the eastern versant and at most 50m on the western one. This situation in the conditions in which those areas are built mostly from steady broad detritus, but whom can't offer optimal condition for the water's retention.

There appears differences in the main Suhard massive due especially to the different relief conditions, on which is add a more stronger demographic pressure directed on certain directions. For the first factor it can be offered as arguments the existence of some relatively seamless areas, with small slops ideal for the practicing of shepherding. In the central compartment is notable the space between the Icoana, Bâtca Târşului and Şuvir peaks, where appears also a name "Şveiţaria" which is related to the practice of shepherding. This ensemble bends easily on the valley of Bistriţa, and as a consequence in this direction the forests have been removed, the limit being, so more descended, while at the opposite side the strong recession of the streams of the Coşna river has lead to the apparition of some valleys with sheerer versants and so less favourable to the grassing. Other is the situation from the southern and northern compartments, where the relief has a slightly bend towards S-W, so it has a favourable exposition, situation which leed to a richer exploitation of the forests as to the practice of an more active grassing at with a larger age (situation so characteristic to the Rodnei Mountains).

In this areas is also added a human influence, a strong one, due to the accessibility of the relief from the wide valleys of Coşna and Someş rivers, with an more back habitation and population and also larger. As well as Morariu (1937), speaking of Rodna, highlights the different extinction of the pasture between the southern and northern versants, in behalf of the southern, as a result of the human intervention as in the compartments case the account is valid. Thus, the gradual cut off of the forest's limit and the continuous widening of the glade by herds men shepherds was made with priority on the versants with southern orientation, while on the northern ones, due to some morphological conditions more restrictive and of glades with a lower value, the deforestations made in pastoral purpose did not have the same amplitude.

The inferior limit of the forest also knows the intervention of the human factor and in consequence it varies in altitude. In the narrow sectors

of the valley, in the conditions of some high slope, it descends until the level of the minor river's bed, even with the risk of always being threaten by the wind intensifications and affected by the smites (the keys between Rotunda and Ţibău).

In the main of the hollows small basins it's found at the level of the highest terraces, at 120m relatively altitude. Near by the sites the man had cut out the forest on the land with shorten slope and the versants with southern orientation, in few cases we can say about the total abolishment of the forest: Picioru Mare under the Ouşoru (which descends toward the Dorna's hollow) and the peak that ties the Omu peak to the Suhard pass (crossing through the Suhard peak). Concerning to the problem of a modification in altitude of the superior limit of the forest, phenomenon dignified in the bordered space of the Rodnei Mountains as to the level of the entire Carpathian, descended with the dendrochronological and botanical researches, that can prove with certainty what was found in the Alps, with priority in the last 50 years, respectively the upgrade of the superior limit of the forests and the altitudinal migrations of some flowery associations from the alpine ecosystems. At the current level of observations and joining the realities from this mountainous massive we can not sustain such an idea. Firstly the high mountainous surface doesn't possess a weather station, besides as the entire massive. We had to draw on the referred dates by the Iezer station, found at certain distance, but accounted satisfactory from the point of view of the altitudinal treat of over 1700m. The dates string considered has offered us the possibility of giving a general image over the disposal of the climatic elements at the Suhard's level, but is briefly enough for us to pronounce over the weather phenomenon with the undone of some clear conclusions regarding the possible heating.

Field observations have confirmed that the forest is found lower than it's natural limit, as an result it has the capacity and tendency of advancing in spaces today occupied by pastures with secondary disposition, but it seems to be about rather a "recovery" a some grounds formally forestry and cut off in time by humans. On this basis it's adding that in the years after 1990 the number of animals sheltered in folds has decreased, it developed the lack of interest on behalf of the people for the maintenance of the pastures in consequence through the natural sowing the limit has upgrade. But in the last three years, the subsides for grounds and the checks initiated by the APIA, has determined those whom use the pastures to interfere for averting the saplings, this way the limits have descend at situation of the 90's level. As for the eventual ecological unbalance, although fragile and hard to maintain in the mountainous areas, this doesn't mean a problem in the higher area of the Suhard Massive.

CONCLUSIONS

As in the entire area of the Oriental Carpathians, recognized for the extent of it's forestry fund and the Bucovinian Suhard Massive is found firstly as well wooded space. Although at first sight the forestry vegetation of this massive seems monotone, it presents differences from the forestry parameters outlook, as in the types of forest and to the productivity. Through the results that come as pursuant to this reality, the forest is not listless as in the analysis for the environment problem, and also to those related to the local economy. Between these, the study on the dynamics of the limits show the human impact as being decisive in it's tracing an maintaining. Thus at it's inferior level, near by sites, and mostly, to the upper one, at the peak's level, in different weather conditions.

REFERENCES

1. Beldie Al.,Chiriță C., 1967, *Flora indicatoare din pădurile noastre*, Edit. Agrosilvică, Bucureşti
1. Călinescu R., 1969, *Biogeografia României*, Edit. Ştiințifică, Bucureşti
2. Chiriță C., Vlad I., Păunescu C., Pătrăşcoiu N., Roşu C., Iancu I., 1977, *Staţiuni forestiere*, vol II, Edit. Academiei, Bucureşti
3. Coldea Gh., 1990, *Munţii Rodnei. Studiu geobotanic*, Edit. Acad. Române, Bucureşti
4. Doniță N., Popescu A., Păucă-Comănescu M., Mihăilescu S., Biriş Iovu-Adrian, 2005, *Habitatele din România*, Edit. Tehnică Silvică, Bucureşti
5. Geanana M., 1972, *Influența altitudinii şi masivității asupra limitei superioare a pădurii în Carpații Orientali,* în Lucrările simpozionului de geografie fizică a Carpaților, Bucureşti
6. Ichim R., 1988, *Istoria pădurilor şi silviculturii din Bucovina*, Edit. Ceres, Bucureşti
7. Kucsicsa Gh., 2006, *Relațiile om-mediu în Parcul Național al Munților Rodnei* (teză de doctorat)
8. Leandru V., 1965, *Vegtația forestieră din bazinul mijlociu şi superior al râurilor Bistrița şi Moldova*, Ghidul celei de-a V-a Conf. geobotanică
9. Pascal P., 1973, *Flora şi vegetația din bazinul Bistriței Aurii (Jud. Suceava)*, teza de doctorat, Bucureşti
10. Popa I., 2004, *Fundamente metodologice şi aplicații de dendrocronologie*, Edit. Tehnică silvică, Bucureşti
11. Popescu-Argeşel I., 1983, *Masivul Suhard,* ghid turistic, colecția *Munții noştri,* Editura Sport-Turism, Bucureşti
12. Seghedin T., 1983, *Rezervațiile naturale din Bucovina,* Edit. Sport-Turism, Bucureşti
13. Simionescu I., 1983, *Flora României,* Edit. Albatros, Bucureşti
14. Stănescu V., 1997, *Flora forestieră lemnoasă a României*, Edit. Ceres, Bucureşti
15. Vuia R., 1980, *Păstoritul din Munții României,* în vol. *Studii de etnografie şi folclor,* II, Edit. Minerva, Bucureşti