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Forest areas from Forest Administration County Suceava that contain certain values that are of critical conservation priority in the forest certification process

Diana VASILE, Virgil SCĂRLĂTESCU

INCDS Brașov Station, INCDS Mihăești Station,
Romania, *diana_vasile@ymail.com*

Established in the FSC Principles and Criteria in 1999, the concept of High Conservation Value Forests (HCVF) has provided a useful new approach for defining and managing forest areas of critical conservation significance. This concept is flexible enough to be applied in a variety of contexts not only in the forest certification. As a result it has been applied in a range of settings, and has been used outside forest certification as well as within it. The FSC standard contains 10 conservation principles, related by several areas. Principle 9 (which is related of HCVF identification) asks the forest manager to take a wider view, and to consider conservation issues of high priority or significance on a national, regional or global scale. In the assessment process of HCVF from Forest Administration County (FAC) Suceava were find an area of 18,543.63 ha with forest areas with high conservation values, which represent 8% of the total area with HCVF identified at national level. From this surface area, the highest percent is represented by forest areas from protected areas (31%), forests with critical seasonal use (23%) and of forests that are critical for erosion control (20%). In all 24 forest districts (FD) were identified HCVF, the highest percent of the total area with HCVF from FAC Suceava, being in FD Crucea (16%), Dorna Candreni and Stulpicani (12%). After the identification of the HCVF, there must be a decision making process that determines what form of management will be consistent with maintaining or enhancing of these values. It must be noted that the FSC standard does not require that an area of forest classified as HCVF becomes a protected area. In some cases, it may be possible to make commercial use of the forest while maintaining the value. Only forest areas from protected areas (National or natural parks, natural reserves, etc) will be completely protected.

Notes:

Analysis of the non-wood forest products utilisation in the Training Forest Enterprise Masaryk Forest Krtiny (Czech Republic)

Jitka FIALOVA, Jiri KADLEC, Hana KUBICKOVA, Petra HLAVACKOVA, David BREZINA

Mendel University in Brno, Faculty of Forestry and Wood Technology, Czech Republic

The utilisation of the non-wood forests products is in the Czech Republic quite high, but there are any information about the state of the utilisation in the forests owned by the Mendel university in Brno - Training Forest Enterprise Masaryk Forest Krtiny. The research financed by the Ministry of Education, Youth and Sports, COST LD14054 - Non-wood forest products in the Czech Republic and the Faculty of Forestry and Wood Technology MENDELU Internal Grant Agency No. 2015010/2015 has been done for four month during each of the years 2014 and 2015. The questionnaires were used as the best way how to collect the answers from the people - the visitors of the forests. The automatic counters for the exact number of visitors during four months (June, July, August and September) were used every year. The pilot data for the survey are already collected and are analysed nowadays. The answers of the visitors will be analysed according to the age of tourists, their status and the distance they had to go to reach the forest. The results will be used by the management of the Training Forest Enterprise Masaryk Forest Krtiny for example for the prevention steps how to preserve the nature - to prevent the damage by collecting the specific kinds of non-wood forest products

Notes:

Who shall pay for ecosystem services and how much? - An Analytic Network approach

Marian DRAGOI

Forestry Faculty, Stefan cel Mare University of Suceava, Romania

According to the Romanian Forest Act the ecosystem services provided by forests shall be assessed and the forest owner shall be compensated for the opportunity cost of not the using right to harvest the allowable cut she or he would have had in normal condition, without any obligation to manage the forest in order to produce more ecosystem services instead of wood. The same law also says the compensations shall be paid by the direct and indirect users of the ecosystem services, which makes the problem even more complicated, because the public authority responsible for forest management turns into a middleman between all stakeholders who take advantage of the ecosystem services and the forest owners. Some of these stakeholders can be easily identified while some don't, simply because the end-user is each human being, whose welfare depends on good environmental condition.

Having a lump sum for compensating the private forest owners whose forests are banned from any harvesting operation, the question is to collect this sum from all direct and indirect end-users in a fair and transparent way. The bottom line of such a problem is to consider all interactions between the four types of stakeholders (end-users) – public authorities, public companies, private companies and households – and the ecosystem services. These interactions have been plugged into an analytic network process and the outcome is a series of weights assigned to each end-users, taking into account that each main type of forest ecosystems produces a specific bunch of ecosystem services. Because some ecosystems services come together (water regulation and soil protection) while some other are conflicting (biodiversity preservation vs. carbon sequestration, biodiversity conservation vs. non-wood products), some clusters have been conceived in order to facilitate a thorough analysis of all interactions. In order to facilitate a deeper analysis, each main type of ecosystem services was broken down in more specific services, easier to be assigned to a narrow group of stakeholders.

Notes:

Influence of environmental factors on phenophases occurrence of forest species: a case study on Romanian historical data

Marius TEODOSIU

National Institute for Research and Development in Forestry "Marin Drăcea", Romania

The paper analyze the influence of different climate drivers: the large scale circulation expressed by NAO and the local climate expressed by temperatures - monthly, daily or some surrogates - altitude, aspect for phenological data of forest species from Romania. As a case study, the dependencies of bud burst and flowering on temperatures were modeled also with the Dynamic Model and the Growing Degree Hours model, using the PLS regression, for two varieties (early, late) of Castanea sativa.

Overall, increasing altitude means a delay in the occurrence of the phenophases, with the greatest influence on seeds ripening (2.8 days/100 m, $p < 0.001$) and about the same for leafing (2.2 days/100 meters, $p < 0.001$). Lower influences (1.2 days/100 m, $p < 0.01$) presents bud burst and flowering. The influence of the slope is mostly insignificant, being present only in certain species and on some phenophases ($p < 0.05$): bud burst (black locust, white lime) or leafing, flowering, seed ripening and leaf coloring (Silver fir, maple, small leaved lime).

For all the phenophases, negative relationships of phenophase occurrence were found with the NAO values, among which the best covariable was the mean of the values for the first three winter months. The sign of the relationship was the same in the case of the temperatures, the delay being of 1.3 days/oC when all the phenophaseswere combined, but with differences across them (2.5 days/oC - bud burst, 2.3 days/oC - leafing and 2.1 days/oC leaf out). An increase of 5.5 days/oC was found for the growing season length. The best temperature predictors were found the mean values of April or of February-April (about 55% of variability explained). When modeled the influence of the daily temperature, the values of the chilling requirements were the same for the two Castanea varieties (36.12±5.22 CP in bud burst and 18.29±5.92 CP in flowering), but different in heating. The analysis of the dependencies of the phenophases occurrence on the mean temperatures of the chilling/forcing periods lead us to a mixed pattern of the two. The exception was found in the bud burst of the early variety, dependent only on the mean temperatures of the forcing period.

Notes:

The response of Ips typographus, Ips duplicatus and Pityogenes chalcographus adults to combinations of their synthetic aggregation pheromones in field tests

Nicolai OLENICI, Alexandra ISPRAVNIC, Iulian DĂNILĂ, Mihai-Leonard DUDUMAN, Valentina OLENICI

INCDS Campulung Moldovenesc Station, Forestry Faculty, Stefan cel Mare University of Suceava, Romania

Ips typographus (L.) and Pityogenes chalcographus (L.) are the most serious pests of Norway spruce, Picea abies (L.) Karst., in Romania, but recently Ips duplicatus (Sahlberg) became in some areas an important pest too. Pheromone traps are used to monitor the flight activity, but also for mass-trapping of these bark beetles in order to protect the new tree stand margins. In the areas where at least two of these species are abundant, it would be economically efficient to combine the pheromone baits in the same traps for simultaneously catching the beetles of both species. Two field experiments with Intercept Panel Traps, each with five complete randomized blocks (replications), were organized to study how the response of I. typographus, P. chalcographus and I. duplicatus beetles to their own aggregation pheromone is affected by combination of pheromone baits. In the first experiment we used synthetic pheromones of P. chalcographus (Atrachalc®) and I. duplicatus (Atradup®), in the second one pheromones of I. typographus (Atratyp®) and I. duplicatus (Atradup®), all products delivered by Chemistry Institute Cluj-Napoca.

The traps baited with both pheromone baits (Atrachalc and Atradup) captured 33.5% fewer beetles of P. chalcographus than traps baited with Atrachalc, and 76.0 % more beetles of I. duplicatus than traps baited with Atradup, but these differences are not statistically assured at $\alpha = 0.05$. The male proportions of P. chalcographus (approx. 27 % of the total catch) and I. duplicatus (approx. 43 %) have not changed significantly as a result of the combination of both pheromone lures.

The traps baited with Atratyp and Atradup captured 39.9 % fewer individuals of I. typographus than traps baited with Atratyp, and 186.0 % more individuals of I. duplicatus than traps baited with Atradup, but only the second difference was statistically assured at $\alpha = 0.05$. The proportion of males of I. typographus (approx. 42 % of the total catch) has not changed significantly as a result of a combination of both pheromone lures, but in the case of I. duplicatus proportion rose from 36% to 45.5 %, the difference being however not statistically significant at $\alpha = 0.05$.

The results indicate a trend of response reduction in I. typographus and P. chalcographus beetles to their own aggregation pheromones when the traps are also baited with synthetic pheromone of I. duplicatus, while I. duplicatus beetles amplify their response in the presence of pheromone baits of each from the other two species. Consequently, combining pheromone lures is justified only where I. duplicatus is uppermost species and should be avoided where the other two more aggressive species are prevalent.

Notes:

Soil erosion manifestation in arable lands in Vaslui County

Ovidiu IACOBESCU,[1] Ionuţ BARNOAIEA[1], Ciprian PALAGHIANU[1], Cătălina Oana BARBU [1], Maria Rodica IACOBESCU[1], Adriana Roxana BARNOAIEA[1],

[1]Universitatea „Ștefan cel Mare" Suceava, Facultatea de Silvicultură, Str. Universității 13, 720229, Suceava, Jud. Suceava, *silvic@usv.ro*

The land degradation process is related to a complex of factors that could initiate and accelerate the degradation rate. The most common land degradation phenomena in Romania are soil erosion by water and landslides, being responsible for approx. 90 % of the entire land degradation area. The land use is one of the factors with significant influence, especially on soil erosion by water. In arable lands, the soil erosion is usually initiated by the use of inappropriate agricultural techniques and/or by inadequate slopes for tillage. In this context, the paper presents an analysis of soil erosion in the arable lands, as this land use exposes the friable soil to erosion manifested on a very high rate. The mapping methodology of the lands affected by soil erosion was based on digital aerial images, field inventory in representative areas and photointerpretation keys. The soil erosion boundaries were drawn in ArcMAP 9.3, classifying each case according to the intensity of sheet erosion (moderately-strong, very strong) or by the size of the gully erosion forms (rills, gullies, ravines). The database behind the vector data contains the administrative units containing the affected lands and will be related to other geomorphological and ecological data.

Key words: sheet erosion, gully erosion, orthophotoplans, assisted visual interpretation

Notes:

Object and pixel oriented classification of high resolution satellite images

Ionut BARNOAIEA

[1]Universitatea „Ștefan cel Mare" Suceava, Facultatea de Silvicultură, Str. Universității 13, 720229, Suceava, Jud. Suceava, *silvic@usv.ro*

Image classification represents the operation of automatic pixel classification into corresponding land cover types. The operation is not reduced to a single image processing, but involves a complex statistical analysis of a set of multispectral images, taken by specific sensors. By the operator's intervention degree, the methods are grouped into unsupervised and supervised classifications. The objective of the research was the comparison of results of supervised classification, approached both from the perspective of individual image pixels classification and by contextual analysis and object-oriented classification.

Notes:

Afforestation - the dark face of forestry

Ciprian PALAGHIANU

Forestry Faculty, Stefan cel Mare University of Suceava, Romania

Forestry encompass a large sphere of different activities such as creating, harvesting, managing, regenerating, and restoring forests in order to achieve different goals and needs that human society demands. A more general perspective can identify forestry as a sequence of alternating regeneration and harvesting activities. But from the outside, the public perception on forestry is that specific activities are limited mainly to harvesting. The regeneration activities are commonly assimilated with afforestation. These regeneration efforts seem to be confined only to ecologist and non-governmental organizations, and numerous reports and statements made by some of these groups have a high impact and are intensely debated. How come that two parts of the same field are so dichotomically separated by the mainstream media? Is the public perception so wrong or afforestation really represents the dark face of forestry, a part of this field that remains hidden from the eyes of the general public? The paper analyses the main facts and presents arguments in favour and against this idea, in order to shed some light on this sensitive and controversial issue.

Notes:

Considerations on the angular acceleration influence to vehicles movement in curves

Dan ZAROJANU

Forestry Faculty, Stefan cel Mare University of Suceava, Romania

This paper seeks to elucidate the effects of the angular acceleration on vehicle movements in curves, especially on transition curves. It is explained the nature of these effects, indicating the difficulties that must be overcome. Finally, we proceed to quantify the influence of angular acceleration in getting over a transition curve.

Notes:

Spatiotemporal association among monthly precipitation and relief in central-west region of Venezuela

Jesús Enrique Andrades RASSI, Hugo Alexander TORRES MANTILLA, Juan Ygnacio LÓPEZ HERNÁNDEZ

Universidad de Los Andes, Escuela de Ingeniería Forestal, Mérida, Venezuela

Venezuela is a tropical country where precipitation is affected both by global and regional conditions, like Intertropical Convergence Zone and relief. The aim of this research is to analyse spatiotemporal relationship between monthly precipitation (time series spatially geocoded data) and relief at central-west region of Venezuela. Two approaches were applied. First, the fit of linear equation by ordinary last squared (OLS). Second was to implementation of modified Moran`s I (bivariate Moran`s I) between variables. Results shows that homoscedastic process and violation to spatial independence in disturbances. A characterization of positive spatial disturbances is done in most of the cases. Bivariate Moran`s I showed positive dominance of spatial correlation during low precipitation months of February and June. It reveals that orographic effect is especially high during first semester of the year. Nevertheless, these results are conditioned by the asymmetric distribution of precipitation. After the transformation of the variables it is possible that results could be completely different.

Notes:

Evaluation of normality determining spatiotemporal autocorrelation of monthly precipitation in central-west region of Venezuela

Jesús Enrique Andrades GRASSi, Ledys Cuesta HERRERA, Juan Ygnacio LÓPEZ HERNÁNDEZ, Arnoldo GARCÍA

Universidad de Los Andes, Escuela de Ingeniería Forestal, Mérida, Venezuela

Venezuelan monthly precipitation data is geocoded, discontinuous in space and time. Missing data, summarized records, installation and removal of stations is common. Second order properties were evaluated (spatio-temporal autocorrelation), but data is not normally distributed. After that a Box-Cox transformation was applied because it is known that non normal distributions trends to hide spatio-temporal autocorrelation. Intensity of spatio-spatial autocorrelation was determined using Moran's I and its cluster variant LISA. Both were used with their spatio-temporal version. Cluster analysis allowed the characterization of precipitation stations using k-means with five groups of monthly precipitation (low, low-medium, medium, medium-high and high). Results show an increase of the amount of clusters mapped and better representation of precipitation.

Notes:

Cervus Elaphus Trophy Assessment in Toplita Region

Gabriel DĂNILĂ, Andrei BUTUCARU

Forestry Faculty, Stefan cel Mare University of Suceava, Romania

The purpose of the paper entitled ”Cervus Elaphus Trophy Assessment in Toplita Region” is the comparative analysis of the trophy scores, according to the Conseille Internationale de la Chase (C.I.C). The data taken from two administrations was analysed: from three hunting areas at A.V.P.S. Toplita and one hunting area at O.S. Toplita.

The main method of data collecting was the analysis of the hunting area documentation for the last ten years. It was used all the data and trophy elements with scores higher than 150. The calculus revealed the fact that the C.I.C. score medium value was slightly higher at A.V.P.S. Toplita in comparison with O.S. Toplita.

As for quality and quantity, the trophies obtained by A.V.P.S.Toplita are superior to those obtained at O.S.Toplita. As a first conclusion, A.V.P.S. Toplita manages better the Cervus Elaphus population. The latter conclusion is that the decrease of the main predator population leads to a better quality and more quantity of trophy collecting.

Notes:

Ecotoxicological response in different polluted soils

Corneliu POHONŢU

Forestry Faculty, Stefan cel Mare University of Suceava, Romania

Main causes of soil pollution are generally created by: industrial activities, as a result, the industrial waste, chemical utilization in agricultural activities, with modern pesticides and fertilizers, waste disposal, accidental oil spills, oil leaks during storage and transport and acid rain, when pollutants present in the air mixes up with the rain and fall back on the ground. Hence, the effects deriving from here are multiple, from health of humans, to changes in soil structure, decreased soil fertility, effects on growth of plant and toxic dust. The aim of this paper was to determine the current rate of pollution for four different soil polluted types. The soils were sampled from: Iasi municipal landfill, Botosani municipal landfill, Gura Humorului municipal landfill and Crucea – Suceava the uranium mine area. This method involves quantification of phytotoxicity response for seeds germinated on each soil type. For germination processes were chosen the seeds of plants with fast germination ability (Lepidium sativum) and hyperaccumulation of pollutants capacity (Sinapsis alba). Results showed that the best tolerance of seeds in germination process had Sinapsis alba in soil from Gura Humorului municipal landfill.

Notes:

Bird species diversity in poplar plantations: a comparison with different land use categories

Gabriel DĂNILĂ, Anca MĂCIUCĂ, Lucian GROSU, Marius TEODOSIU

Forestry Faculty, Stefan cel Mare University of Suceava, Romania

The energy poplar plantations are in expansion in the north-eastern Romania, so the aim of our study was to investigate the influence of these plantations on avian diversity. We carried out bird counts in two experimental blocks of 10 ha, where semi-natural forest vegetation, pastures, poplar plantations and agricultural land live in similar surface areas. The bird richness and abundance are the highest in forest vegetation, followed by agricultural lands, pastures and poplar plantations; the last ones are used by birds only for foraging and nesting, not for breeding. The landscape parameters analysis reveals for now a high variability due to relatively small size patches with different land uses, with complex edges and adequate connectivity, offering proper conditions for diverse bird species. The trend of extending the agricultural monocultures (especially colza) and poplar plantations observed in the last years will have a negative impact on local bird communities. If this will be the case, in order to soften this effect, it is advisable to avoid large areas with simple edges of poplar or agricultural plantations, to maintain the hedgerows alongside plantations and the areas with different land use to alternate in space.

Notes:

The analisys of forest management from UP II Dolhesti, forest district Dolhasca during 1991-2011

Andreia ANDRICI, Gabriel DUDUMAN, Liviu NICHIFOREL

Forestry Faculty, Stefan cel Mare University of Suceava, Romania

This paper aims to highlight how forest management in U.P. II Dolheşti in the period 1991-2011, to identify weaknesses in implementing the provisions plannings or effects of their absence. As in the study area were identified stands restituted to fulfill the purpose they were analyzed separately from those of the state.

The study was based on data from forest planning, information collected in the field and those identified by orthophotoplans imported into ArcMap program. To highlight the differences was simulated production development fund structure in case of a housekeeping uniform level of ownership form. Comparisons were made following the normalization of production fund for a period of 120 years, the fund structure dynamics simulation production periods of 20 years and the possibility of calculating the principal and secondary products by age class method. The results obtained show that management stands were properly belonging to the state in the 20 years through compliance with forest management. Not so evidenced in the case of private landlords stands, restitution interventions after having a negative impact on fund structure production and harvesting volumes.

Notes

The field response of *Ips typographus* to the verbenone and MCH

Iustin-Constantin GIOSANU*, Marius-Valerian PARASCHIV **, Gabriela ISAIA *, Stefania TOTOS ***

*Faculty of Silviculture and Forest Engineering, Transilvania University of Brasov,
** Forest Research and Management Institute Brasov,
*** Institute of Research in Chemistry Raluca Ripan, Babes Bolyai University Cluj-Napoca

The spruce bark beetle Ips typographus is one of the most aggressive and serious pests of Norway spruce stands. Some of pheromone components, such as verbenone (Vn) and MCH, can act as inhibitors, lowering the attraction to the aggregation pheromone. Our experiments were conducted in 2010 and 2015. In the experiments were used as antipheromones verbenone (Vn) and methylcyclohexanone (MCH), but also AtratTYP PLUS with an aggregate role, all these being made by I.C.R.R. Cluj-Napoca.

These substances have been used in 2010 in two experimental devices: the first containing traps baited with these substances, and the second consisted of spruce logs baited with these substances. It was found the anti-aggregate effect of Vn and the MCH for secondary attraction (experiment with traps): the attraction reduction of 20% in the case of Vn, 35% for the MCH and 55% in the case of Vn+MCH. It wasn't found the anti-aggregate effect of Vn and the MCH for primary attraction (experiment with logs). It wasn't found significant influence of tested inhibiting substances on sex-ratio of Ips typographus.

In 2015 four different release rates of Vn+MCH were tested in field experiment with Intercept® traps, also baited with aggregation pheromones. It seems that the highest level of release rate of Vn+MCH insures the lowest captures of Ips typographus beetles. We have not yet clarified regarding the best way of storing these anti-aggregation pheromones.

Notes:

The dynamics of the degree of ecoprotective functions accomplishing in private forests in the last 20 years. Case study in Production Unit I Deia, Forest District Vama

Catalina Oana BARBU, Liviu NICHIFOREL, Ramona SCRIBAN, Stefania PLAMADĂ

Forestry Faculty, Stefan cel Mare University of Suceava, Romania

After the fall of the communism, in 1989, the private ownership on forestlands gradually increased in Romania. There were three main restitution laws 18/1991, 1/2000, 247/2005 and the maximum forest estates for private individuals was: 1 ha (1991); 10 ha (2000) and Restitution in integrum (2005). Approximately 353,000 ha of forests (5,5%) were restituted according to law 18/1991. The aim of this paper is to study the evolution of the degree of ecoprotective function of stands in Production Unit I Deia, Forest District Vama under natural (windthrows) and anthropic disturbances (illegal logging). The research methodology requires the GEF index (degree of ecoprotective functions accomplishing) calculus for state and private forests for the years 1990 and 2014. In the state forests the changes in index values were influenced by the windthrows and natural evolution of the stands while in private forests by anthropic disturbances. For the state forests the GEF index values show a slight increase in 2014. In the private forests the GEF index value for 2014 decreases by 2-3 points compared to 1990 (prior forest restitution).

Notes:

The association Hieracio transsilvanico-Piceetum Pawlowski et Br.-Bl. 1939, from the river Suceava basin

Cezar Valentin TOMESCU

Forestry Faculty, Stefan cel Mare University of Suceava, Romania

As a result of the researches in the river Suceava basin we have been identified phytocoenoses of the association Leucanthemo waldsteinii-Piceetum Krajina 1933 association. We have identified and described this association in the next areas: Negru brook - Brodina de Jos, Dubiuşca crest, Poiana Roşişnei, Dariciuc brook - Izvoarele Sucevei, Cobilioara - Izvoarele Sucevei, geographic spring of Suceava river, Aluniş brook. These phytocoenoses are representative for the studied area and were analyzed the floristic composition, the spectrum of bioforms, the spectrum of phytogeographic elements and the Ellenberg's indicator values of ecological indices.

Notes:

Comportamental typologies of private forest owners regarding forest management adaptation to the climate change

Laura BOURIAUD, Vasile-Cosmin COSOFRET

Forestry Faculty, Stefan cel Mare University of Suceava, Romania

Forest management adaptation to the climate change is a matter of forest type, disturbances regime, but also a matter of forest owners' behavior face to the climate change issue. The knowledge of factors who determine people to respond at climate changes challenge is essential to explain their perceptions regarding the climate changes adaptation. We have conducted a study in North-Eastern Romania with the aim to identify the perceptions and attitudes of private forest owners regarding the climate change and the forest management adaptation to climate change.

Notes:

Rarau-Giumalau project – little insights into research work in the northern carpathians

Rouven CORTHUM

University of Applied Forest Sciences Rottenburg, Germany

In Summer 2015 the forestry faculty of Stefan cel Mare University Suceava was involved in the Rarau-Giumalau project of „Natura si noi“, a Non-Government-Organization from Vatra Dornei. In line with the project a lot of different studies about the forests, plants, animals and social impacts were executed by umpteen organizations. Thereby, the forestry faculty was responsible for protected habitats, plants and invertebrate species. For the research about habitats a network of 355 plots for forest inventory was developed and inventarized, selfsame for plant inventory. Besides, landscape typical habitats were mapped, too. The research of invertebrate animals was focussed on indicator species, which can show the nativeness of forest ecosystems. The autochthonous spruce forests and the well mixed mountain forests have a very high amount of deadwood, which depicts a big potential for biodiversity. As a part of my internship semester I got the opportunity to participate in the project and catch a little insight in romanian research work.

Notes:

Influence of the type of forest reproductive material and planting density on Max 4 hybrid poplar clone - Populus nigra x maximowiczii in biomass accumulation

Iulian Constantin DĂNILĂ, Daniel AVĂCĂRIȚEI, Mihai-Leonard DUDUMAN, Savin ALEXEI, Cătălin-Constantin ROIBU, Lucian GROSU, Olivier BOURIAUD, Laura Gianina BOURIAUD

1. Forestry Faculty, Stefan cel Mare University of Suceava, Romania
2. National Institute for Research and Development in Forestry "Marin Drăcea", Romania

Hybrid poplar clones (Populus spp.) have become an important part of forest economy at global level. They respond to the necessity of obtaining large quantities of biomass with multiple uses within a short period of time, period that overlaps the strategic development plans of major investors in the field. In this respect, it is proposed to highlight the productivity differences of Max 4 hybrid poplar clone depending on the nature of the forest reproductive material and the planting distance on row.

The experiment was installed in the hilly region of northeastern Romania and the measurements were made after two periods of time: after 4, respectively 5 years from the installation in three experimental blocks (B, C and D, where the planting distance and type of plant material is variable). The biomass was determined distinctly on tree parts (trunk and branches). A different behavior of the cuttings is observed towards rods and rooted seedlings for the two periods of time analyzed. The production cycle's increase from 4 to 5 years brings a significant biomass intake for all types of utilized reproductive material and by doubling the planting distance the biomass at individual and branch level increases.

Notes:

The influence of the soil management and mycorrhiza inoculation on biomass accumulation of some poplar hybrids clones from Suceava Plateau, Romania.

Alexei SAVIN,[1] Iulian-Constantin DĂNILĂ[1], Daniel AVĂCĂRIȚEI[1], Mihai-Leonard DUDUMAN[1], Vlăduț-Maricel HAZI, Paul GROSU, Cosmin COȘOFREȚ[1], Olivier BOURIAUD[2], Laura Gianina BOURIAUD[1]

[1]Universitatea „Ștefan cel Mare" Suceava, Facultatea de Silvicultură, Str. Universității 13, 720229, Suceava, Jud. Suceava, silvic@usv.ro;
[2]Stațiunea Experimental de Cultura Molidului, Str. Calea Bucovinei 73, 725100, Câmpulung Moldovenesc, Jud.Suceava, cercetare@icassv.ro;

The experimental area (about 4,0 ha) was located in Suceava Plateau (Bălcăuţi hills), in the north-east part of Romania. Biomass accumulation were measured during two crop years (2013-2015) on three clones of poplar hybrids (AF8, AF2 and Pannonia). The area was divided into several plots depending on sites of culture (tillage field/ fallow field), the presence or absence of mycorrhiza and cultivated clones.

From the conducted researches were observed different behavior of poplar clones depending on soil management, above ground biomass differences being almost the 1000% into a tillage field compare to a fallow field. Studies have revealed that in the early years of culture, mycorrhiza inoculation does not have a significant effect on the biomass growth. Among the analyzed clones, clones of Italian origin (AF2 an AF8) had higher growths compare to Pannonia clone.

Notes:

Finding solutions for production planning which are characterized by surplus exploitable stand

Costel POPA, Gabriel DUDUMAN

Forestry Faculty, Stefan cel Mare University of Suceava, Romania

This paper aims at finding optimal solutions for planning regime managed forest areas regularly experiencing surplus exploitable stands in relation to the normal surface or volume relative to normal. For this purpose they were presented through the general concepts related to the production fund, how to determine the normal size and actual productive funds, the constitution of excess and normalization methods forests SUP structure A.

For three production units, components Tazlău Forestry, Forestry Department Neamt, UP. III Şoimu, UP. Geamăna IV and UP. V Tazlău highlighted, based on data from previous plannings, high favorability climatic factors for woody vegetation species in the area, and how it has evolved since the 50s of last century, the foundations of planning for these areas. Also highlighted developments exploitable surplus areas and the volume of wood, and their calculation methods presented in the literature and adopted Romanian plannings.

After an overview of methods for calculating the possibility of main products in the forests for the past two decades and the current decade has shown how the application of management plans for their implementation by Romanian management planning in the particular case of each of the three units production, aiming age class structure and the constitution of regular surfaces in the three decades, in terms of the sacrifices of exploitability. It highlights the comparative development opportunities taken and the main products harvested volumes and high volume products derived from accidental I precept that prevented fulfilling the provisions of management plans. This paper presents the structure of age classes reached in production currently studied as well as unanalyzed two production units, highlighting the existence of similar situation to the entire surface of SUP A bypass. Starting from the actual structure of periodic surfaces within a production cycle of 120 years, it examines the evolution of the structure under scenarios of increasing or decreasing the production cycle, pursuing parallel evolution exploitable surface excess and surface total distributed sacrifices exploitability for setting periodic surfaces, taking as example Şoimu UP III, considering that the other two production situation is similar. After identifying the optimal situation where the total surplus exploitability sacrifices are minimal, starting from the current structure is simulated to fund productive same production, development for seven decades before the real periodic surface structure for production cycles 120 years and 100 years. It examines the parallel evolution of surfaces exploitable surplus fund structure and evolution of the normalization while the harvest opportunities will be taken disrupted by accidental precept products.

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