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BOOK of abstracts

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Plenary session

Carbon stock in European Forests: State of the Art, Uncertainties and Political Challenges

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The paper summarizes the most important papers published in the last decade on three issues dealing with carbon sink: methodological issues on assessing the carbon stored by forest vegetation, life-cycle analyses and bio-energy. The first section presents a short history of the progress made in evaluating the carbon contents in different components of the forest ecosystem, the second one is being focused on the complexity of life-cycle analyses while the bio-energy section mostly deals with the dilemmas concerning the use of wood pellets, bio-ethanol and bio-diesel.

The situation of virgin and old-growth forests in Romania – seen from an outside perspective

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Romania and Ukraine harbor the largest stock of virgin forests in Europe; within the EU countries Romania has about 60 to 70 % of all virgin forests. Next to Ukraine Romania also contributes with almost 24.000 ha the largest part of European beech forests to the UNESCO Heritage European Beech-Forests (= Ancient and primeval Beech Forests of the Carpathians and other Regions of Europe). The Romanian virgin and old-growth forests are also home to the continent's largest populations of wolves, bears, and lynx. But these large surfaces of the last remaining virgin forests are also seen as cheap and readily available timber resources. Within the last two decades vast legal and illegal but in general unsustainable logging practices have been the reason for the disappearance of virgin forest at large scale and heavy environmental impacts to many other woodland areas. Cheap lumber is sold to dealers and consumers throughout Europe and also to US America and to Asian countries whereas domestic value chains in the forest and lumber sector did not develop and even declined.

So, many of these outstanding virgin forest areas have been degraded and / or have been destroyed. There are many reasons why the loss of virgin forests and their long-term preservation is under threat. Among them, the following are most be serious:

• Lack of political stability and continuity.
• Continuation of unsustainable and also of illegal logging (cutting over quota, cutting without permission, cutting in protected areas etc.),
• Breaches of both national and European legislation
• Weak implementation of the existing Forest Law and its Secondary Legislation.
• Lack of coherence and application of legislation concerning the governance of virgin forests.
• Procrastinated and delayed implementation of support (compensation) for private forest owners and no initiatives for smart regional development that includes adding value potential to virgin forest areas.

It is a mutual challenge for the civil society, NGOs, administrations and policy makers to combat destructive practices, save the natural treasure of virgin and old-growth forests of Romania and also to integrate this important European natural heritage into economically viable rural development concepts.

EU ecological network Natura 2000 integration into national Protected Areas system: Lithuanian experience

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Lithuania joined the European Union (EU) in 2004. Since then EU ecological network Natura 2000 is in operation in our country. All EU countries should integrate Bird's (BD) and Habitat Directives (HB) into national legislation, but each country can separately select a way how to do it. The most important task is to create a network of Special Protected Areas (SPA), under the Bird's Directive, and Special Areas for Conservation (SPA), under the Habitat Directive. Creation of SPAs in Lithuania was very successful and all, except one, Important Bird Areas (IBA) were designated as SPA. Totally, 84 SPAs were designated in Lithuania, covering about 10 percent of total country's area in order to protect 62 species of breeding birds and many more on migrations or wintering. Most of the SPAs gained a status of „traditional" protected areas types, such as reserves, national or regional parks, meanwhile 32 SPAs got a status of new protected areas type – biosphere polygon. Biosphere polygon is less strict and more flexible in regulations comparing to the rest of types of protected areas and aimed to protect target species by polygon's zonation.

Creation of SAC (potential Sites of Community Importance, pSCI) network, process still not completed. At the moment 475 pSCI were designated in Lithuania, covering about 11 percent of total country's area in order to protect 49 species and 54 natural habitat types. All pSCIs gained a status of „traditional" protected areas types. In the year 2012-2014, was carried out full-scale country inventory of habitats of European importance. The results reveal that natural habitats cover 7 percent of the country's area. This inventory allows better to estimate the area, needed for the protection of each habitat type and to make some corrections to national SAC's designation process.

The bulk of SPAs and pSCIs overlap, so the whole Natura 2000 areas network in Lithuania consist of 559 areas and covers 13 percent of country's land area and 15 percent of total country's area.

In order to regulate management activities within the Natura 2000 sites, were compiled general provisions for the conservation of bird species of Annex I (PD), species of Annex II and habitats of Annex I (HB). A dozen of Natura 2000 sites have individual regulations. Private land owners have possibility to take part in nature-friendly management activities under the Rural development programme and get some extra payments to compensate possible income losses.

The potential of non-wood forest products for Brașov County

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In Romania, forest management is mainly focused on timber production, little attention being given to the potential of non-wood forest products (NWFPs). Compared with wood industry, the economic activities related to the harvesting and marketing of the NWFPs (especially mushrooms, forest fruits and game products) have a very low contribution to the turnover of the forestry units in Romania. The low importance of NWFPs is also indicated by the lack of the policies and normative acts in this domain, harvesting and marketing of NWFPs being done in most of the cases in a chaotic way, without respecting the principles of sustainable management. Across the country, there are several regions with high potential in terms of harvesting NWFPSs, Brașov County being one of them. The aim of this research was to highlight the most important non-wood forest products from Brașov County. The analysis model proposed within FP1203 COST Action European non-wood forest products network was used and therefore four categories (Mushrooms, Understorey plants, Tree products and Animal origin) of NWFPs and nineteen criteria were taken into consideration. The Analytic Hierarchy Process (AHP) was used and the alternatives (i.e. the NWFPs) were pairwise compared against each in order to determine the NWFPs with the highest potential for Brașov County. The analysis were done with Expert Choice Desktop software package. The selected NWFPs consisted in dog rose (Rosa canina L.), raspberry (Rubus idaeus L.), honey fungus [Armillaria mellea (Vahl) P.Kumm.], truffles (Tuber spp.), Christmas trees (Abies alba Mill.), chamois (Rupicapra rupicapra L.), brown bear (Ursus arctos L.) and St John's wort (Hypericum perforatum L.). The truffles were the NWFPs with the highest potential for Brașov County, followed by the Christmas trees and the chamois. The less promising (i.e. with the lowest potential) NWFPs were dog rose' berries and the St John's wort. By taking into consideration that in the case of more than half of the forests from Brașov County wood harvesting is not permitted, it is expected that the forest managers and forest owners will pay more attention to the NWFPs, that could become an important source of income.

Forest Health session

The map of *Hylobius abietis* development duration in coniferous or mixed forests of the Eastern Carpathians

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Hylobius abietis (Coleoptera: Curculionidae) is one of the most important pests of young coniferous plantations in Europe. Feeding with the bark of the seedlings stems, pine weevils can cause significant losses due to seedling drying as a result of girdling, and a severe attack can lead to a total smash of young plantations. Consequently, various solutions aiming to prevent the attack of the weevil have been proposed. A quite effective and environmentally friendly solution consists in delaying the reforestation of clear-cut areas, until the most weevils emerged from the stumps and roots disperse toward newly cut areas, and the timing of this phenomenon is determined by the beetles' development duration, which in turn depends on site conditions (altitude, slope aspect). On clear-cuts situated below 1000 m, regardless the slope aspect, the weevils develop in 2 years. Between 1000 and 1400 m altitude, the beetles develop in two years only on sunny slopes, while on the shady ones, at 1000 - 1300 m above sea level, they need 2-3 years to complete their development, and at over 1300 m altitude, the weevil's development takes more than 3 years. Taking into account these data, local or regional thematic maps can be developed through GIS analysis techniques, in order to provide the forest managers with information about the length of weevil's generation in any point of the administered territory. Thus, starting with the digital elevation model (DEM) of the Eastern Carpathians (30 m resolution), there were established four altitudinal classes (<1000 m asl, 1000-1300 m asl; 1300-1400 m asl and >1400 m asl) and two aspect classes (North+East and South+West). Overlapping these layers over the map of the land with coniferous forest in the studied area, resulted a zoning of forests according to the duration of development of *H. abietis*. This map is particularly useful also for optimizing the protection measures that should be applied depending on the risk of attack, in situations where postponing planting cannot be accepted for various reasons.

Research concerning a new combined lure for *Ips typographus* and *Pityogenes chalcographus*

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The bark beetles are the most important pest of spruce stands in Romania. The control measures against outbreaks of the bark beetles *Ips typographus* L. and *Pityogenes chalcographus* L. mainly consist of evacuating infested trees from the forest before the new generation of adult beetles emerge and installing trap trees in those areas or the use of the flight trap loaded with commercial pheromones atraTYP and atraCHALC. In this context, the main objective to achieve was to obtain combined experimental pheromone for these two species of Scolytinae. In order to improve the composition our experiments were performed during three years (2015, 2016 and 2017) in four experimental plots.

Geographical distribution of the black timber bark beetle (*Xylosandrus germanus*) in Romania

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The black timber bark beetle is an invasive ambrosia beetle species native to East Asia, accidentally introduced to Europe and for the first time collected in Romania in 2009. Given its polyphagy, sib-mating system, and rapid spread by flight and as a result of the transport of infested wood by humans, it could become an important pest in the forests, nurseries, orchards and vineyards. Consequently, we studied the geographical distribution of the species in our country. For this purpose, in 2015, three Intercept® traps baited with ethanol were placed in each of 13 points distributed in the country and monitored for 3-5 weeks during June-July. In 2016 and 2017, 3-5 traps baited with various attractants were set up in 54 and 17 locations, respectively, in 66 locations being at least a trap with ethanol. They were kept in the field from (April) May or June to September, and the biological material was collected every 2-3 weeks. The presence of the species was also detected elsewhere in the country by trapping insects in some traps used in other

experiments. In 34 out of the 84 monitored points in the years 2015-2017, at least one individual of *X. germanus* was collected, the total number of captured specimens being 4269. In the most points (18) less than 10 specimens were captured, often only 1-2, in 8 points 11-100 insects were captured, in 7 were 101-1000 and in one point more than 1000 insects. In other projects, samples of *X. germanus* were collected from other 6 points. The insects were caught in traps without attractants (in two places), or in traps baited with synthetic pheromone of *Trypodendron lineatum* (in three places) or ethanol (one place). On the whole, the biggest catches were obtained at traps with ethanol, in one case being more than 2,300 insects/trap. The species was collected on a high elevational gradient, starting at 18 m above sea level, in the Danube everglade, at Giurgiu, up to over 1200 m a.s.l. (Mestecăniș Ridge, at Cârlibaba), in tree stands with varied compositions and ages. The largest catches come from altitudes ranging from 400 to 1000 m, especially from aged tree stands that have beech in their composition. The data available so far indicates that the species is being spread in the country and that in some areas it has already established, quite numerous populations.

The importance of parasitoids in pest control. Case Study: little spruce sawfly *Pristiphora abietina* (CHRIST) (Hymenoptera, Tenthredinidae).

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Our research showed that the presence of parasitoids in the cocoons was in proportion of 23%. Of this proportion, 2% were chalcidoids, 2 % braconids and 19% ichneumonids.
Regarding chalcidoids, was obtained a species of genus Tritnepsis, Suprafamily Chalcidoidea, Family Pteromalidae, that was represented by 6 females, 1 male and 1 larva. At the moment of the study this species do not was identified because are missing recent reviews, the key for identification used in Europe is from 1969, contains only three species of the genus, obtained species does not fit into them.
For the braconids has been identified just de family, at the moment of the study don't was identified the species.
From the ichneumonids family, a total number of 8 species were identified, from 5 subfamilies (Banchinae, Cryptinae, Ctenopelmatinae, Mesochorinae şi Tryphoninae). The species *Mesoleius ruficollis* Hlgh. and *Ctenochira flavicaudata* Rom. are new in Romania. *Pristophora abietina* (CHRIST.) is the new host species in Romania for species: *Agrothereutes abbreviatus* F., *Mesoleius ruficollis* Hlgr. *Lissonota folii* Thoms., *Endasys analis* Thoms., *E. brevis* Grav., *E. testaceus* Taschb., *Mesochorus brevipetiolatus* Ratzb. and *Ctenochira flavicauda* Rom.

Our research emphasizes the importance of parasitoids in the control of insects which produce damages in the forest. Also, prove the need for some forest management measures which to protect the parasitoids populations.

Testing automated pheromonal traps for monitoring the seasonal flight activity of *Ips duplicatus* bark beetles

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Bark beetles are some of the most widespread and important pests in the resinous forests. Monitoring the flight activity of these insects is one of the main activities of the forestry and forest protection officers, which is a great deal of time and human resources. In this context, the present research has proposed to test the efficiency of an automatic recording device for the number of *Ips duplicatus* bark beetles located inside the flight traps. It was used three such traps, mounted at the forest edge, were mounted in line with a distance of about 12 m between them. A digital weather station was used to record meteorological data. At the end of the monitoring period, the recorded and counted data were compared, resulting approximately 90% efficiency of automatically counted devices. Also, a variation of catches may be observed depending on weather conditions, in periods with precipitation they are completely absent.

Growth and mortality of hybrid poplar short rotation culture (AF8 clone) in response to *Clostera anastomosis* L. (Lepidoptera: Notodontidae) defoliations

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Short rotation poplar plantations recorded a boom during the last period of time, due to the rising demand of energy biomass. At the moment, just in Suceava district there are cultivated more than 600 ha. These plantations are the object for infestations with a number of insect species, among which, at least in North – Eastern country, *Clostera anastomosis* is very aggressive. The impact of *C. anastomosis* defoliations was in the most situations only estimated. In 2017 spring, the insect developed a severe outbreak in a 5 year hybrid poplar plantation, in Siret meadow, close to Zvoriștea village (Suceava district). In October 2017, there were done observations and records in order to assess the losses caused by defoliations. The analysis of 1685 poplar trees indicated that 88,4 % were affected by defoliations and 28,9 % died. Assessment of 150 poplar trees indicated significant radial growth loss during the defoliation year (with 90,6 % at dead trees and 82,2% at partially defoliated trees). Regarding the high increment, the effect of defoliation is low, with 23,8 % at dead trees and only 13,3% at the partially defoliated trees. The differences between the effects of defoliation on diameter, respectively on high increment are most likely the consequence of the fact that the defoliation intensity was the highest after the trees ceased the high increment, overlapping the diameter increment.

The influence of resinous natural volatile emissions on *Hylobius abietis* beetles' response to different concentrations of synthetic attractants

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Hylobius abietis L. (Coleoptera Ord., Curculionidae Fam.), know in our literature as the pine weevils represents an important pest of the young coniferous plantations of Europe. The damages created by the adult specimens of this species represent an important obstacle in the successful realization of regeneration, to a large extent of the boreal forests from the North and North-East of Europe. The adult *Hylobius abietis* use olfactory signals for their orientation and for the identification of the adequate under layer for reproduction (oviposition). The signals are represented by volatile substances emitted by the coniferous tree trunks, which contain monoterpenes, including (-) alpha-pinene (AP) and ethanol (ET). The current thesis analyzes the olfactory behaviour of the *Hylobius abietis* beetles in the context of the variation rates of emissions of the alpha-pinene in the cutting areas and the way in which the age of the area has an influence on the population of H. abietis and on the trap capturing with synthetic attractants. In May 2016 there have been installed, within the Vama D.S. Suceava Forest District, 60 traps in two cutting areas with clear cutting, one in the spring of year 2016 and the other one in the previous year. There have been used three types of dispensers, with three rates of different volatilization: 50 mg/day; 200 mg/day; respectively 500 mg/day. The results of te experiment have shown that the *Hylobius abietis* adults have noticed the differences between the experimental scenarios from the one year old cutting areas, and in the fresher cutting area there were significant differences between the scenarios only in the case of the captures registers with the volatilization rate of 500 mg/day. At the same time it has been determined that the dynamic of the captured beetles is different from one experimental surface to another. Thus, in the case of the cutting area exploited in the year 2016, the evolution of captures has presented a bimodal variation, as to the one year old cutting area where the maximum of captures has been registered in the first period of the experiment, following the decrease of the level of capture up until the end of the studied period. In general the presence and the distance of the tree trunks from the traps with synthetic attractants have not influenced the answer to the tested versions.

Forest policy economics session

The harmonization of Natura 2000 plans with forest management planning: what impacts, what solutions?

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Natura 2000 is the key instrument to protect biodiversity in the European Union (EU). Forests are of crucial importance for Natura 2000 representing approximately 50% of the surface area of Natura 2000 sites (European Commission, 2012).
The implementation of Natura 2000 Habitats Directive at the national level has faced different challenges, and the implementation practices vary significantly depending on the region and on the social and political context existing within these regions. In Romania, the implementation of Natura 2000 has taken a rapid development especially after the entrance in the EU. Nevertheless, various studies consider that the designation of the protected areas have been done rather in a top-down manner without intensive studies of the situation on the field.
In Romania, according to the legal requirements, the provisions of the Natura 2000 plans superpose the provisions of forest management planning. Thus, all forest management plans have to be adapted to the requirements of Natura 2000 plans. In this context, the aim of this analysis is to identify in how far the implementation of the Natura 2000 management plans result in general and practical requirements and recommendations for forest management planning.

The study integrates 50 of management plans analysed for all the Natura 2000 sites which are located in Nord – East Romania, with valid management plans by the end of February 2017. 40 out of these 50 Natura 2000 sites have been found to be present with forest areas. The management plans of the protected areas have been analysed considering key words referring to 1) the technical requirements used for forest management planning; 2) technical terms used in silviculture and forest harvesting and; 3) specific restrictions related to forest management.

The results of the analysis show that the technical references to forest management planning are scarcely integrated in the Natura 2000 management planning, and only 8 plans have references to existing functions assigned to forest ecosystems and only 1 plan to the existing sub-units used in management planning. In respect to the requirements for specific silvicultural works, the results show that most of them are provisions of the existing technical requirements for forest tending and forest regeneration, thus not imposing additional restrictions. These are mainly found in those sites in which National Forest Administration-Romsilva is a custodian. In respect to specific requirements with impact of forest management the analysis has identified a limited number of requirements: 1) the need to leave a certain amount of dead wood (in 11 sites); 2) the need to keep habitat trees (in 5 sites) and 3) temporary restrictions for harvesting (in 4 sites).

Time expenditure of a cut-to-length clear cut operation in a dried spruce stand

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While extensively used in the Nordic countries, in the last years the cut-to-length harvesting method had gained popularity also in Romania due to the fact that these systems are characterized by highly operational performance. In order to better understand a system that is newly introduced in the forestry sector, time studies should be carried out to emphasize the advantages or disadvantages of a certain system.
The time study data was collected during harvesting operations in a dried out Norway spruce stand situated in the north part of Romania in order to determine the time consumption of a cut-to-length Valmet 911.4 harvester.
All of the observations were made in the field for 11 days by using a digital camera mounted in the windshield of the harvester. At the end of each day shift the video files were saved on a hard disk drive. Further on all video files from the database were examined in the office phase using special time study software (AvixR Method®) provided by Sölme AB, Sweden.
After analyzing a total number of 716 trees our results suggest that the net productivity in the clear cut was about 27 m3 x h-1 respectively 74 trees per hour or a total number of 323 processed pieces. The structure of the cycle elements shows that the greatest proportion from the total time is spent for delimbing the trees (45%) while the time spent for tree-top processing takes 9% from the delay-free time. From all the work elements the recalibration of the head and the cross-cuts summed the smallest proportion.
The results of the research underlined that in optimum conditions for the studied system the productivity is superior to any other system that is used in our country.
Also, further research will be done to cover different operational conditions for harvesting systems in Romania.

Forest certification in the context of highly regulatory legal frameworks: the case of Romania

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Forest certification is a voluntary tool used as a market instrument to provide a guarantee to the consumers. In Romania, only the Forest Stewardship Council (FSC®) certification has been applied and currently 26 certificates for forest management are in place covering 2.68 million hectares of

forest.

The management of forests in Romania is based on a highly regulatory framework – called forestry regime- routed in the traditional forestry system implemented in the context of socialist countries. Despite the existence of such a strict legal framework, governmental reports have proven important illegalities occurring at different levels of forest practices.

The aim of this paper is to assess to which extends the application of FSC® certification in Romania, has resulted in the identification of gaps in the application of the legal framework. To do this, we have analysed the public reports existing in the FSC® data base.

The results of the analysis show that in the period of 2011-2017 a total number of 748 non-conformities and observations has been recorded by the auditors. By comparing the non-conformities with the existing regulations, 57,69% of the non-conformities identified represented a violation of the national legislation.

The failure to comply with current legislation puts pressure on the first principle of FSC® standard which refers to the fact that forest management should comply with national law. If for one certificate repeated acts that violates the legislation are identified, then the capacity of the company to respect the legal requirements is first to be questioned. At the same time, the capacity of the legal system to be implemented efficiently is questionable, as even the companies that express the willingness to adhere to a voluntary system have important problems to first comply with the existing legal system.

Using the contingent valuation method in the planning of urban forests: an aplication for the Dendrologic Park Șipote

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The importance of green spaces in urban areas is a concept more and more discussed and included in the political agenda. Investments in green infrastructure can change the perception of residents, visitors or future investors about the attractiveness of a city. However, such investments are not easy to be achieved. Besides the human and financial capital necessary for the physical realization of the investments, an essential aspect is the perception of the inhabitants or visitors about the possible alternatives to combine the recreation facilities with the forest-specific natural landscapes.

Romania's legislation often hinders the transformation of the forests around urban areas in forests with park-specific facilities as long as changing the destination of the forestry area into other uses requires a difficult bureaucratic process.

The main purpose of the research is to identify the perception of the local community regarding different alternatives of transforming an urban forest into a park. The specific research objectives are: 1) the identification of community's preferences for alternative strategies involving cutting off different sizes of forest to create recreational facilities; 2) the identification of preferences regarding the recreational facilities desired in an urban forest; 3) the identification of the willingness to pay for the investments needed to create a forest-park.

The object of this study is represented by the forest surrounding the Suceava citadel, named Șipote Dendrological Park. The area is a public forest managed by the Forestry Department of Suceava, the

Forest District of Pătrăuți and currently has assigned recreational and soil protection functions.
To identify the value of ecosystem services that are preferred by the local community we have the contingent valuation method that helps identify consumers' preferences over a range of alternatives. The method was based on the creation of three credible scenarios to test the alternatives for setting up the park. The scenarios refer to no forest cuts, a cut of 30% of the area and a cut of 60% of the forest area. 302 questionnaires have been applied to identify citizens' preferences for one of the scenario, their desired preferences for investments and their willingness to pay. The analysis of the opinions was carried out on different profiles of respondents.
The results show that the local community wants to retain the recreational function of the forest and desires in addition investments involving the creation of facilities for outdoor activities. Most of the surveyed participants are in favour of the second scenario which will involve a cut of 30% of the forest area. Nevertheless, the majority of the respondents are not willing to pay for the additional facilities even though they estimate at about 5 million Euros the investments needed to transform the current forest in a forest-park with multiple recreational facilities.

Forest melliferous resources in the Republic of Moldova

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Exploiting of forest melliferous resources is within the sphere of activity of various production and processing enterprises but also is a subject of increased attention of scientific, social and environmental organizations. The purpose of the research is to describe the forestry melliferous resource sector of the Republic of Moldova, identification of melliferous capacity of plants and influence of some factors on honey resources. The research objectives were: inventory of taxonomic composition of forest melliferous plants of the Republic of Moldova; analysis of the phenological spectrum of flowering of forest melliferous plants; identification of factors that influence honey resources; melliferous capacity of some forest plants; identification of the opportunities for the development of honey resources. The research methods were: studying of specialized scientific literature, analysis and synthesis, organizing and systematization of information, analogy and comparative data analysis. Taxonomic composition of the forest melliferous plants from the Republic of Moldova comprises 41 families, 129 genera and 224 species. After the flowering period forest melliferous flora consists of 136 spring species and 88 summer species. Spring plants belong to 32 botanical families dominated by Fabaceae (21 species) and Scrophulariaceae (18 species), Lamiaceae (16 species), Rozaceae (13 species). Summer plants belong to 20 botanical families dominated by Fabaceae (14 species), Lamiaceae (14 species), Asteraceae (12 species), Scrophulariaceae (11 species). According to biological cycle forest honey plants are presented in such a way: annual-13%; biennial-9% and perennial-78%. According to biological form forest melliferous plants are represented by trees-15%; shrubs-11% and herbaceous plants-74%. Most of the forestry plants of the Republic of Moldova have a medium beekeeping share (46%), 28% have a small apiculture share. Plants with a very high apiculture share account for 1% and large apiculture share have 5%. The current area of the forestry fund (421.7 thousand ha) can feed around 1000000 bee families.

Forest and society session

Afforestation and reforestation management - migrating to sustainability and responsibility

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Considering the present state of afforestation and reforestation management in Romania, the process of renewing the forestation paradigm is analysed. Most of the management systems uses an iterative method of improving the outcomes.

Considering the classical phases Plan-Do-Check-Adjust, the forest management system is broken into pieces in order to reveal potential gaps from planning to system adjustments regarding forestation. The official data reports, national statistics and forest regulations represents evidences of a system that fails to progress.

The weak integration of Pan-European criteria and indicators for sustainable forest management, the lack of a robust planning system and the poor capacity of accessing European funds are considered major gaps. The whole framework of afforestation and reforestation should be revised to comply with recent realities and objectives (social, economic, environmental). At present time Romanian forestry still forge the future forest using a normative and technical background tailored to socialist/communist era, without taking into account updated objectives regarding social needs, economic benefits, climate change mitigation or new types of property. Several suggestions for improving the afforestation and reforestation framework were provided.

Identifying and mapping cultural ecosystem services as part of the forest certification process

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Forest ecosystems account for a large range of services that are currently defined in four categories: 1) supporting ecosystem services; 2) provisioning ecosystem services; 3) regulating ecosystem services and 4) cultural ecosystem services (Millennium Ecosystem Assessment, 2003).
The Romanian forestry system integrates many of the ecosystem services in the forest management planning process by assigning to each stand a specific functional category which is linked to recommended silvicultural measures. The general division of functions is in forests with protective functions and forests with productive functions. The forests with protection functions include most of the regulating ecosystem services (soil protection, water protection, climatic protection) while the only cultural services addressed refer to forests providing recreation services.
Giving the importance of cultural services for the societies in developed countries, additional cultural

services beside recreation are recommended to be evaluated as part of the overall ecosystem services assessment. The Forest Stewardship Council (FSC®) certification scheme specifically considers the identification of a larger set of cultural services as part of the identification of High Conservation Value Forests (HCVF). Nevertheless, there is no clear definition of what these cultural services refer to and no clear methodology for their identification.
In this context the analysis aims to identify: 1) what bundles of cultural services can emerge from the forest certification process; 2) what tools and methods exist for the identification of forests with cultural services; 3) how are the forests with cultural services addressed in the forest management planning.
The methods used for the analysis rely on data provided by the public reports existing in the FSC® data base combined with available information regarding the identification of HCVF. The reports refer to a total number of 27 certificates for forest management (FM) in place covering a total area of 2.68 million hectares of forest (40% of the area occupied by forests in Romania).
The results of the analysis show that the cultural services identified as part of the certification process generally refer to forests near cultural and heritage establishments (such as churches and monasteries) or to the forests providing important aesthetic and recreational values. A summary of the alternative tools used for the identification of the cultural forests are provided relying both on desk assessment of best available information and public consultations.

The paper concludes that the FSC® certification brings additional valuable inputs in the identification of cultural services which are not considered in the normal process of forest management planning.

Perceptions regarding forest management in Romania: Case study on first year students of Forestry Faculty

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Romanian forests and their management have become lately an important subject of discussions in the society. The process is largely driven by the information presented in mass media which tend to present the image of the Romanian silviculture and forests in a negative way without grounding their messages in scientific information.
The most common stereotype is the so-called deforestations. Although the term has been correctly explained - as the clear cutting of the forest resulting in the change of land use category, a very rare case in Romania - the inertia at the level of public perception is still consistent. We can assume that perceptions define reality, but perceived reality is a subjective interpretation, sometimes ambiguous, which hides parts of the truth and also false things.
In this context, our study's goal was to identify and analyze the perceptions on Romania's forests and management from the perspective of the first-year students of the Forestry Faculty. The target group is selected as to identify the perceptions of students before their mental models are shaped by the curricula addressed in the Forestry Faculty. In the same time, because the students choose to make a career in the field of forestry, the identified perceptions are important to assess what were the motives behind their decisions.
To collect the data a questionnaire adapted to the forest and forestry situation in Romania was created. The questionnaire has been distributed online and it is based on questions with predefined answers and one open question. The study was conducted on a sample of 151 students (of which: 36

girls, 115 boys) in the first year at Forestry Faculty in three consecutives academic years (2015, 2016, 2017).
The results show that from the perspective of the students the forest means: life for 17.2% of the respondents, trees/vegetation for 13.9% and nature for 11.9%. At the opposite we find: harvesting (2%) and future, landscape, and silviculture (each with 1.3%). Regarding Romania's forests management, the general perception is that more and more timber will be cut in the next years. On average 38% of the surveyed students consider that forests are certainly not properly managed. Although currently more than 50% of Romania's forests are private forests, on average 47% of students would like to work as forest engineers in a state-owned forest district and only 18% in a private one. It is also noted the low enthusiasm of the first-year students to work in research or forestry education.

Social networks and norms driving the firewood market for household's needs

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Despite the concern of sustainable use of the forest biomass resource, the literature on firewood markets for household needs is quite scarce in Europe. In two regions situated in Central and Northern -Eastern Romania, a former socialist country with more than 7 million inhabitants using firewood as main source for winter heating, we have developed and implemented a two stages research methodology to analyse 1) how important is the local market for firewood consumption, and 2) how the market for firewood to satisfy the households needs is driven by formal and informal norms at the local level. In a first step, we focused on household' behaviour as consumer of firewood, in conducting a questionnaire (N=526) to assess the volume of and practices in firewood procurement and consumption. We have conducted a survey in nine centers with different forest resource endowment conditions. The households were chosen on a systematic selection scheme with random start and fixed pitch. In the second step, we have identified the firewood providers in a municipality situated in Suceava county, and we have designed a semi-structured interview (N=25) to identify their practices in relation to the firewood trade. The findings show that the firewood remain the main source of heating used in the region, with an average yearly consumption by household of 8.9 m3. A diversity of local arrangements is in place to supply the firewood demand, from village-based network of (illegal) timber traders to officially registered companies, with timber procurement depending in most of the cases, practices in product marketing and procurement. These findings are discussed in relation to the official governmental recent changes on the timber selling and transportation legality.

Cognitive and relationship factors determining landowners' perceptions about forest

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Landowners representation about the utility of the forests they own may help to predict behaviour in relation with the forest management issue. The theory of planned behaviour is used to investigate the forest owners' differentiation in their attitude towards forests. Due to the lack of data about forest owners in Romania, we have established through the snow-ball sampling technique a population of 321 individual forest owners, mostly from Northern Romania, from 23 localities. The questionnaire that has directly answered contained questions to describe the forest owner experience with the forests, the forest owner relationship in forest management, the individual forest owner's cognitive variables, and his/her social representation of forest utility. The analysis shows that the landowners have a full perception of forests as providing timber and non-timber benefits, while the factors mostly influencing the forest owners' behaviour are the level of studies and the proximity with the forests (how distant is the forest from the landowner's house). The conclusion is that while the landowner is aware about and fond of environmental forest services, e.g. fresh and clean air, protection against floods and avalanches, health recovery, the main utility driving their behaviour is the firewood procurement. The gap between the intended behaviour, e.g. the preference for environmental services, and the real behaviour, e.g. law trespassing, illegal logging, is explained by the external factors such forest policies regulating timber extraction from forests. The results suggest that this gap can be covered by the development of the informational policy means and a more flexible forest policy taking into account the firewood basic needs of forest landowners.

Ecology and environment session

Phenotypic variability of Sorbus torminalis (l.) Crantz trees in the central region of the Republic of Moldova

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According to the legislation of the Republic of Moldova, the wild service tree (Sorbus torminalis (L.) Crantz) is assigned to the rare species of the wild flora – 8th category of rarity (The Law on the Fund of Natural Areas Protected by the State no. 1538-XIII of 25.02.98. Official Monitor no. 66-68 of 16.07.1998). Currently, there is no direct risk of extinction of this species in forest ecosystems. However, because of its high value and constant demand for its wood along with the sporadic distribution in stands, conservation of the wild service tree in situ and its reproduction deserve particular attention.

In the Republic of Moldova, the wild service tree is found in the mixed forests of the Central Moldovan Plateau and Tigheci Plateau. It is more common in "Plaiul Fagului" and "Codrii" nature reserves as well as within the state forestry enterprises of Nisporeni-Silva, Călăraşi, Orhei, Hîncești-Silva forestry enterprises and in the Străşeni forest-hunting enterprise.

This study presents the results of the research on the variability of certain characters of the wild service tree in the central region of the Republic of Moldova (Vatici, Bravicea, Vărzărești, Călăraşi, Străşeni, Scoreni, Ciorăşti, Nisporeni forest districts and "Codrii" nature reserve).

The studied samples included 600 trees from 7 forest sites and 7 forest types. In each site stand, observations and measurements were made on 30 trees in order to determine the diameter of the trunk, the total height, the pruned height (expressed in % of the total height), the crown diameter, the eccentricity of the cross section of the trunk, the straightness, the type of trunk (according to the presence and the position of the bifurcations), the presence of suckers, and the health of the trees.

The height of the trees varied from 9.7 m to 20.1 m (CV = 11.5-34.3 %) and the diameter varied from 12.8 to 37.0 cm (CV = 15.9-52.5 %). The pruned height varied from 32.8 to 51.9 % of the total height, a favourable index that allows obtaining high yields of long logs. The variation of the eccentricity of the trunk is generally low (D/d=0.96-1.07), (CV=3.0-10.1 %), since the trees have round trunks.

The trunks of the trees were not bifurcated, or bifurcated in the upper part; the trunks were straight or curved in the upper part, without suckers or with 1-2 suckers on 1 linear meter of trunk, which indicates on the possibility to obtain high quality timber.

Current distribution of golden jackal (Canis aureus L.) in Romania and its effects on competitors and pray species

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In the period of 2006 – 2017 based on stock assessments data performed by hunting organizations, the Romanian golden jackal (Canis aureus L.) populations had increased their distribution area from 13 to 37 counties out of the total 41. In the same time the stock assessment data shows a 6.7-fold exponential growth from 1,871 specimens to 12,206. However, many European previous study results denote an uneven distribution pattern and regional core areas inside distribution range. These features are characteristic for Romanian distribution range as well, but only in terms of differing densities. At level of year 2017, the current distribution area of golden jackal in Romania seems to become continuous and covers approximately 90,000 km2 that represents about 41% of the country total area.

We studied the diet of jackals using stomach content analysis, and body weight of red foxes (Vulpes vulpes L.) from areas where they live sympatric with golden jackals and from golden jackal-free habitats. Effects of the jackal's diet on pray species and issues of the competition between mesopredators are discussed.

Our diet analysis results show a wide trophic niche breadth, lower small mammal consumption and higher plant matter consumption in comparison with other study results. Anthropogenic food did not occur in substantial proportions, neither small game (hare and pheasant) species. We found that the most important big game species in golden jackal's diet is the wild boar. Protected pray species were not found in golden jackal's diet. It seems that the golden jackal is a typical food generalist omnivorous species, without any constraints in terms of abundance limiting food source. Nevertheless, we have found high nutritional niche overlap between golden jackal and sympatric red fox. Comparative analyses of body weights of red foxes living sympatric with golden jackal and of those without contact with this species revealed that the golden jackal does not affect the population densities of red foxes, but the mean body weight of sympatric juvenile red foxes is smaller than in golden jackal free areas.

Level of contamination with the some heavy metals in acacia flowers (Robinia pseudoacacia) from the Republic of Moldova

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The purpose of this study was to determine the content of heavy metals (Pb, Cu, Zi and Ni) in acacia flowers (Robinia pseudoacacia) - the main melliferous forest species in Republic of Moldova More than 90 samples were collected from forest ecosystems, protection strips and trees on the edges of the car routes and the level of heavy metals (HM) contamination in acacia flowers was assess. In the Institute of Ecology and Geography with Spectroscan Maks-G was determined the level of the heavy metals by the Roethgen-fluorescence spectrometry method.
In the representative samples the level of heavy metals fell below the maximum admissible limits (MAL) established by the World Health Organization (WHO) for medicinal plants (Table 1), with the exception of two cases for Cu.This fact makes efficient to use of acacia flowers in beekeeping and pharmaceutical.

Table 1. The mean values of heavy metals content in acacia flower (Robinia pseudoacacia) samples according to the geographical area of Republic of Moldova mg/kg, d.s.

	Pb	Ni	Cu	Zn
North area (29 samples)		0,13	2,54	4,60	6,42
Center area (31 samples)		0,15	2,65	5,10	6,59
South area (23 samples)		0,14	2,58	5,09	6,39
Chișinău (14 samples)	0,10	1,65	6,74	14,49	
MAL for medicinal plants (WHO, 2006, 2009)			2	10	20	50

In depending on the geographical area, on average, the HM values studied didn't show significant differences, with some increasing tendencies for the central area of Republic of Moldova. Based on the result of the spatial distribution of the level of HM contamination of acacia flowers (Robinia pseudoacacia), we have the recommend for economic purposes for beekeepers and the entities subordinated to the “Moldsilva” Agency keep away to use of the acacia in near the industrial areas of Balti municipality, Rezina city, Chisinau municipality and the south-eastern part of the Republic of Moldova.

The analysis of habitat conditions offered to bird populations by the forests of U.P. VII Suharău, OS Dorohoi, Botoşani district

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Birds are important bioindicators and play an essential ecological role in forest and agricultural ecosystems; consequently monitoring them and ensuring ecological conditions for maintaining optimal populations are important elements of sustainable forest management. In order to analyze the habitat conditions for avifauna, it is proposed the use of a Total Favourability Index (TFI), determined according to the number of layers of the stands, shrubs composition and distribution, stand density, composition and biological value of vegetal species and stand age dynamics.

The TFI value for UP VII Suharău indicates an average ecological potential for birds; this kind of assessment gives the possibility to develop management measures so that the ecological potential to become high and the ornithological diversity to improve**.**

Aspects on the black grouse (Lyrurus tetrix L., Tetrao tetrix) prevalence in Romania

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The paper tries to synthesize the research done on the Lyrurus tetrix tetrix species in Romania. It points the importance of the species as an ecological, geographical and historical indicator.

The Black Grouse is a monument of the nature, as it is considered a glacial relict. For this reason, it deserves more research, in the contest of the rapid degradation of the natural ecosystems.

We also try point out the fact there are certain areas in Romania, which are not registered in the specialty literature, and where the Black Grouse is widely spread.

The vascular flora of the Secular Forest Loben – Suceava County

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One of the newest forest reservation in Suceava County is the Secular Forest Loben which was declared a protected area by the Government Decision no.1.143 of 18 September 2007, with the approval of the Commission for the Protection of the Nature Monuments of County Council Suceava, No. 1111 and 1112 from 2nd May 2006.

This protected area has 483 hectares and it is situated near of Rașca Village – Moldovița Commune, in the hydrographic basin of Moldovița River - from North of Romanian Eastern Carpathians. The main tree species of this forest are Norway spruce, European silver fir and beech.

The paper presents the results of the first cormophyte flora inventory from this reservation, as a result of the fieldwork conducted during 2013-2017.

Observations regarding the Blue spruce' development in Romanian nurseries and the possibility of using it as Christmas tree

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In our country the main species used as Christmas trees is represented by Abies alba. This kind of trees are usually obtained in specialised nurseries or from mature trees, whose top will be cut. If the cut is not made at the proper time, this fact could represent a bad development of the damaged tree in the future. The spruces and the other resinous species are not used in our country as Christmas trees. Also, we have no a lot of special nurseries in our country for obtaining this kind of dendrological material. Blue spruce could be one of the species used in our conditions as Christmas trees. Picea pungens var. argentea is the best known of the exotic species belonging to the Picea genus and also the most popular species spread in the landscape of our country. In spite of that, this species is rarely used as Christmas tree, even abroad is a representative species for this aim. Native from Rocky Mountains, North America, this species is very decorative, frequently used in landscapes and private gardens. In terms of this species growth and development in our climatic conditions, there are no more researches or bibliographic references in the literature. Because of that, this paper could represent a contribution. The aim of this study is to present some data and pictures concerning this species' development in our climate conditions and to prove that it could be recommended as a Christmas tree. Concerning that, there were made visits to specialised nurseries in obtaining of spruces. In that nurseries there were made a lot of measurements: trees' tall, stem diameter and crown's diameter, in order to calculate the minimum age for a tree to be used as a Christmas tree. Also there were made comparisons concerning the best way of obtaining the trees, by seeds or by grafting.

Silviculture and Forest engineering session

The effect of the bearing capacity of the foundation ground on the volume / cost of the gravity dams used in torrent control activity

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In the paper we analysed the influence of the bearing capacity of the foundation ground on dams' volume. Within a theoretical model we analysed 125 dams that have all the possible combinations of:

- five height categories – according to valley height;
- five usual spillway heights – corresponding to the same values of maximum load in the spillway and depending on the width of the of the valley;
- five categories of foundation grounds – widely spread on the site, corresponding to five bearing capacities.

We used widely dams with extended foundation towards the upstream and made of concrete C8/10 class. At the spillway dimensioning the most unfavourable loading schematic was taken into account, along with class IV security coefficients and basic and supplementary loads.

To accomplish an economic optimum is necessary to minimize the cost of each work, translating into a reduced dam volume (a reduced transversal section area). The exterior and interior stability conditions have become obligatory conditions for dimensioning and the creation of the objective function.

According to the above, 125 dam variants have been dimensioned, identifying obvious tendencies regarding the transversal area variation related to the height of the spilling water, dam's useful height and bearing capacity of the foundation ground.

We consider these results important in the idea that prove that the indicator specific investment (the cost of planned works divided by the length of the riverbed) is influenced by the nature of the foundation ground and its use in comparing projects placed in different conditions is not recommended (at least not in the case of dams).

Spatial distribution of land degradation phenomena in Vaslui County (Romania), Criuleni (Republic of Moldova) and Bolgrad (Ukraine)

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Land degradation processes alter the morphological and structural characteristics of the land in a manner that allows the identification and mapping of the boundaries of the affected areas through different means. Among the materials available for an efficient identification and mapping are the high resolution aerial orthophotographs, acquired for the areas of interest. The mapping methodology is practically mixed, based on terrestrial inventory in representative samples from each type of degradation, overlay on digital imagery through georeferencing and mapping the entire area based on the photointerpretation keys constructed in such manner.

Field work was done in representative areas, identified through preliminary analysis of the digital imagery and the 1:25000 maps. The field data was recorded alongside the GPS coordinates of the boundary of the entire degraded area and also the elementary units inside. Photointerpretation keys are calibrated for each target are from Vaslui, Criuleni and Bolgrad and contain representative images and descriptions of each type of degradation and elementary unit, as well as specific instructions for each target area.

Based on the keys, the actual mapping of the degraded lands was applied, using a "push-broom" method of analysis of the entire area, using an overlay of aerial images and georeferenced topographic maps. The resulted maps have been validated through subsequent field visits in random areas.

The determination of technical harvesting ages for the main wood species of Romania

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In the present study the technical harvesting ages were calculated for the main wood species from Romania. Twenty-one species were included in analysis. The range of considered assortments is larger than the assortments presented in the actual technical norms. Among these species are: Norway spruce, silver fir, beech, different types of oaks, birch, hornbeam and others. Twelve target wood assortments were fixed, the same for each species. The actuality and the necessity of this study is given by several factors, such as: the diversification of the ownership structure over the forest lands in Romania; the necessity to rethink the way in which target assortments are set, taking into account the requirements of small forest owners; the importance of knowing the technical harvesting age for other wood assortments, different from those presented in the technical norms; the upgrade of the technical harvesting ages considering the new versions of yield and sorting tables. Since the current technical harvesting ages are based on the old Romanian yield tables and taking into account the numerous changes of the Romanian forest laws, an upgrade of harvesting ages becomes necessary.

Structural diversity and spatial patterns dynamics at the Eastern limit of beech forest distribution

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The main purpose of this study was the analysis of spatial pattern and structural diversity in a natural beech stands located on the Eastern limit. Strict observations regarding structural diversity and it's dynamics, structure simulations witch can show minimum surface needed for forest inventory, and also this study took a closer look into classic and synthetic indices used for diversity assessment.

From the analysis of structure simulation for the year 2016 it was observed that for areas smaller than 0,04ha, stand structure was irregular, and regression coefficients can't adjust it, nor have been introduced. Also we haven't been able to identify the predefined patterns for areas of less than 0.25 ha, while the area under about 0.36 ha appears concave structure and for surfaces up to 0.49 ha we find negative exponential curve type. For areas of more than half a hectare (0.6 ha) included the type of structure, characteristic of natural forest stands, namely the rotated sigmoid. For areas greater than 0.64hectares diameter distribution structure is no longer dependent on the surface, while in the case of the smaller ones, we can observe a significant relationship between the plot structure and surfaces. In conclusion, at first look we are tempted to say that, if we are dealing with a natural broad-leafed form distribution should automatically be a rotated sigmoid, we can easily mislead, fact demonstrated in this study. In the present study we have also simulated structure for all sizes of areas without taking account of the significance of the coefficients, and the result was: rotated sigmoid form for each individual case.

Poster session

Edible mushroom vs. poisonous mushrooms

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Mycology, the branch of biology concerned with the study of fungi, including their genetic and bichemical properties. Some mushrooms are popular word wide for their nutritional and therapeutic properties, however, some species are dangerous because they cause toxicity. Accurate determination and proper indentification of species is the only safegard against possible accident. Many toxic mushrooms look extremely similar to edible species and in some cases, may growing right next to them. Deadly poisonous mushrooms that are frequenty confused with edible mushrooms and responsible for many fatal poisonings include several species of the Amanita genus, in particular, Amanita phalloides. Before assuming that any wild mushroom is edible, it should be identified.

Pests and fungi as factors in health damage of oak stands (case study)

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ICP Forest Program, recognized worldwide, among causative agents directly responsible for forest health damage, identifies insect pests and fungi groups as well. In the latest reports on the health status of Europe's forests (2015), insects were the predominant identified cause of damage and had caused more than a quarter of all recorded damage symptoms. Almost half of these insect-caused symptoms were attributed to defoliators, which represented also the most frequent of all damage causes. Fungi are the second most frequent biotic agent influencing tree health, in general and crown condition, in particular, in Europe.
Our researches come to assess the health status of mesophilic oak forests (Quercus robur, Q.petraea), valuable forests of our national forest fund, from their natural border of geographic spread, by monitoring experimental parcels (50x50m), in central area of the Republic of Moldova. Were identified the systematic identification of the main defoliator pests insects, their spatial distribution in the investigated field (through BioClas Program), with the indication of trends in the main development stages, the affected part of the tree, and the determination of the trees' damage degree. The evolution and level of infection of the oak leaves by fungus Microsphaera alphitoides according to the 7-step scale was further evaluated, and subsequently mapped by means of the GIS techniques, results necessary for controlling this agent.

Growth of larch (Larix decidua Mill.) seedlings under abiotic stress conditions

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Drought and soil salinisation, the environmental stress conditions most deleterious for agricultural production, will worsen in the coming decades due to the effects of global warming, affecting also the natural growth areas of many tree species. Research on the responses of forest trees to abiotic stress, and implementation of better reforestation strategies are required to address this problem. This study aims to analyse the responses of larch to drought and salt stress. Although larch does not grow naturally in saline habitats, it can come in contact with high salt concentrations either when present in stands near mountain roads – because of the practice of winter de-icing with NaCl – or when grown as an ornamental tree in parks and gardens and low-quality, saline water is used for irrigation. Larch seedlings were grown from seeds originating initially from seven different natural populations (geographically different) in Romania. Seedlings were grown individually in standard pots and watered with Hoagland's nutrient solution. After two months, salt (150 mM NaCl) and water stress (withholding of irrigation) treatments were applied for 30 days. Then, stem length, fresh weight (FW) and water content (WC) of the aerial part were determined. Electric conductivity and humidity of the substrate were also measured. Soil EC increased 5 to 6-fold in the salt treatment, whereas soil humidly was reduced by ~50% under drought conditions. Stem length decreased in both treatments, but the reduction was more pronounced in the case of water deficit. On the contrary, salt stress caused a stronger reduction of FW than water stress. Seedling WC was not much affected by either treatment. The analysis of growth parameters allowed the selection of two populations with an apparently better response to both stresses. Further genetic analyses will confirm and extend the identification of suitable genotypes for reforestation programmes.

Spruce trees growth and forest landscape depending on microstational factors and ecological conditions

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Spruce (Picea abies (L.) Karst) is an important forest tree species in Romania, occupying the second place as spreading after beech, and thus representing approximately 24% of the total forest area. Spruce is a species of excessive continental climate, being mostly conditioned by temperature. Due to its variable temperament, the spruce is generally considered a semi-shadow species. Through the research carried out in Valea Ierii (NW of Romania), the response of spruce was evaluated according to different microstational conditions (e.g. exposure, altitude, density etc.), in nine sample plots, each of them with a surface of 500 m2, on a total area of 10 hectares. There were noted interaction responses as a result of different action of all ecological factors; because all stands under study were pure, composed only of even-aged spruce trees (approximately 35 years), differences may be related to a range of habitats as geosystem levels, respectively altitudinal forest, exposition, density, and other local conditions. The discrimination between response functions among the studied plots (for the trees' traits as height of the trees, trunk and crown diameter, natural pruning, angle insertion on the axis of the branches, straightness trunk, vegetation status etc.) could be based on microstational conditions. Results showed that the trees with South-West exposure and at an altitude of 1200-1370 m belonging from three plots, have accumulated the largest amount of biomass, showing significant differences from the trees of the rest of six plots exposed on North-Eastern and at altitudes comprised between 1170-1380 m. Behavioural differences regarding growth of the trees and biomass accumulation capacity was statistically ascribed to slope exposition, which was therefore considered as principal factor regulating landscape function of the forest, with a strong ecological impact; in regard to this peculiarity (slope exposition), the geosystem has integrated two main geofacies related to the S-W and N-E slopes respectively. In the whole set of populations, the response function varied considerably within the S-W expositional plots compared to the N-E plots exposition, but without significant differences related to trees density and altitudinal level. The superior growth of the trees on the S-W exposition slope was explained due to the young stage of the spruce, and the trees preference until this age for sunny and more dried conditions. Probably, in the next years, the trees' evolution will confirm that the spruce prefers low temperatures, low insolation inside the forest, high and permanent humidity. Further spatio-temporal analysis will be useful for reliable hypothesis to be inferred as functions of the forest, but also landscaping, depending of the trees' age and ecological conditions.

The types of forest ecosystems of ”Dobruşa” protected area

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The physico-geographical position of the territory within the boundaries of the Prut river and the Dniester River basins, situated longitudinally between the Galicia (Eastern Europe) mountains and the Black Sea, includes three types of natural macroecological systems or natural ecobiomes (Central European deciduoas forest, Euromediteranian silvosteppe, and Eurasian Steppe) with tangential-partial interference. This fact determines the specificity of the territory in question through the wide diversity of both vegetation types and types of forest resorts. The adjacent eastern, western and northern territories, according to the ecosystem-based forest diversity, differ essentially from the terrestrial space of the Dniester-Prut interfluvium, whose forest ecosystems haven't been studied and known at the level appropriate for safe use, both in fundamental works related to forestry typology and in practical works related to the establishment of sustainable management measures.
The ecosystem approach in the forest management process meets the requirements of current concerns in national forestry for the promotion of valuable native species as well as of complex tree structures in the context of climate change and of rational exploitation of forest resources. These concerns are reflected in numerous legislative and normative acts on climate change, the conservation, protection and development of forests through their rational exploitation and the maintenance of ecological balance.
The objective of this study was to establish the types of forest ecosystems in Dobruşa protected area, through scientific substantiation, which is very useful both for the preservation of the forest biodiversity and for the sustainable management of the protected areas.

Biochemical indicators for the evaluation of the oak species health status, edifying of forest ecosystems, in the central area of the Republic of Moldova

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The health status appreciation of oak species from different local habitats in central area of RM was aim of this research. In this study, the assessment of the health status of the oaks was carried out on the basis of biochemical indicators by determining the concentration of chlorophyll" a ", the content of heavy metals (Pb, Cu, Zn, Ni) from the foliar material and the visual estimation of the tree health status parameters through the level defoliation of the crowns and the discoloration of their foliage.
According to the ICP Forests program (ICP-Forests, 1997), three experimental sites (ES) were located on the forest region of Codrii plateaus: ES Ivancea - the Ivancea forestry (parcel 59 L) O.S. Ivancea, ISS Orhei; ES Codrii - the "Codrii" Scientific Reserve (parcel 5 C) and ES Mereşeni - Mereşeni forestry (parcels 48 A and 48 F), O.S. Mereşeni, ÎSS Hincesti. Each ES contained 24 oak trees from grades I and II, by the Kraft classification. Evaluation of the state of health of trees through defoliation of crowns and

discoloration of their foliage, collecting samples of leaves, was carried out in the period in which the leaves are fully developed and well before they turn yellow and fall off. So, it's the second half of the vegetation period (August - September), according to ICP Forests (2012). For the determination of heavy metals (HM) and chlorophyll concentration "a", five trees were selected from which we collected the leaf samples from the crown's upper third. Under laboratory conditions, the determination of heavy metals was performed by the fluorescence Roethgen spectroscopy method on the Spectroscan MAX-G. The level of chlorophyll "a" was analyzed on the spectrophotometer.
As a result of the effects of biotic and abiotic negative factors, the state of health of oak trees studied is the most affected in ES Ivancea, where level of healthy trees (Class 0) is 33.3% only. And the least affected are oaks from ES Mereşeni – 62 5% healthy trees. According to the degree of damage, oaks in ES Ivancea and ES Codrii fall into the category of strong injuries (51-75% in 1-4 defoliation classes).
The maximum concentration of chlorophyll "a" was evaluated in ES Mereşeni (22,31 mg/l), which shows a lower pollution. In ES Codrii and ES Ivancea it's concentration decreases to 20,13 and, respectively, 19,75 mg/l, which confirm to a stronger damage from harmful factors.
In all three cases, the level of heavy metals in oak leaves was included in the heavy metals range in leaves and branches of oak species for the Republic of Moldova (Кирилюк, 2006) (Pb – 0,1-3 mg/kg; Cu – 5-80 mg/kg; Zn – 1-50 mg/kg; Ni – 1-10 mg/kg). With the exception of the Cu content, the HM do not exceed the toxicity threshold for deciduous leaves, by (Bergmann, 1992; Bonneau, 1988) (Pb – 10 mg/kg; Cu – 12 mg/kg; Zn – 50 mg/kg).

Wood anatomical features of Scots and Black pine species growing in Central Romania are affected by drought events

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Tree mortality associated with drought and high temperature events has become a widespread phenomenon during the last decades, affecting forested biomes all over the world.
In 2012, an extended tree-mortality phenomenon was observed in the region of Transylvania, near the city of Brasov. This region has a temperate-continental climate. Individuals of coniferous tree species such as Pinus sylvestris (Scots pine) and Pinus nigra (Black pine), planted decades ago outside their natural range in the surroundings of Brasov, were mostly affected.
Using wood cores sampled in two forest stands (one per each species) affected by tree mortality on a paired sampling design (living vs. dead trees), we analyzed tree responses to past climatic variations over the last decades. For this, we considered a total of five trees per species and per status (living and dead). Using a microtome, we obtained thin wood sections from the sampled wood cores. Those sections were further on stained (safranin and astrablue), and mounted onto permanent glass microscope slides. High resolution images of the thin sections were then captured and analyzed using a Matlab-based software called DACiA (Dendrochronological Analysis on Conifer Wood Anatomy). Specifically, we analyzed several wood anatomical features (cells number, radial lumen diameter, cell-

wall thickness, cell area, hydraulic conductivity, and carbon cost). Wood anatomical features were analyzed and the whole ring level, and separately for the earlywood (EW) and latewood (LW) wood sections.

Preliminary results on our wood anatomy database showed that the cell-wall thickness was positively correlated with the amount of June precipitation over the last 30 years, but significantly only for Scots pine. Hydraulic conductivity and carbon cost investment were more pronounced in dead than in living trees in the year prior to death for Black pine, although no significant differences were detected neither at the whole ring level nor separately for EW and LW. For Scots pine, the cell number was significantly lower in dead trees than in living ones in 2012 (a very dry year), the year when most of the trees died. Radial lumen diameter was slightly larger for dead trees in dry years (2000, 2012) for Scots pine, while drought events did not affect the cell area of the two species. Drought seems to play a determinant role on the growth of Scots pine and Black pine at our two study sites, mainly having a negative impact. However, our results are still very preliminary and analyses should be extended on more study sites in order to draw robust conclusions.