

Contents and Abstracts of the Bulletin of Forest Science

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Vol. 6, Nr. 1, 2016

Csaba MÁTYÁS and Koen KRAMER:

Adaptive management of forests and their genetic resources in the face of climate change...7–16

Abstract – The consequences of the projected climatic changes on the health and growth of European forests are for the time being still unresolved and debated. Analysis of provenance tests and dynamic modeling of four European tree species indicate that the impacts are regionally different. In the temperate-maritime zone, expected rise of temperature – in case of sufficient precipitation – may lead to growth acceleration without significant genetic change. In the southern continental and Mediterranean zone, at the lower (xeric) limits of distribution, however, summer drought increase will trigger higher susceptibility to diseases and mortality, and may cause local extinctions and shifts of distribution area. Extreme selection may narrow genetic variation and cause decline of stability, key attributes to withstand environmental changes. Results confirm that the prudent use of regional differentiation in genetic diversity and stability may provide possibilities for alleviating climate change risks and increase the fitness of next generations. The presented policy principles of adaptive management are based on results of the FORGER project, and were published as Policy Brief (Mátyás and Kramer 2016).

Gábor ILLÉS, Tamás FONYÓ, László PÁSZTOR, Zsófia BAKACSI, Annamária LABORCZI,
Gábor SZATMÁRI and József SZABÓ

Results of Agroclimate 2 project: Compilation of digital soil-type map of Hungary...17–24

Abstract – According to the tasks of Agroclimate 2 project it was necessary to compile from forestry and agriculture viewpoint an equally applicable soil and landsite database with countrywide coverage. To achieve this by the unification of present forestry and agricultural landsite databases and by using a set of meaningful environmental predictor variables under the umbrella of digital soil mapping approach we started to compile digital soil maps. Our efforts resulted in the first version of Hungary's new digital soil map, which provides information on soils with a spatial resolution of 1 ha. On the basis of the validation of the map

we concluded that its confidence is approximately 70%. By the exploitation of refining possibilities provided by the digital soil mapping methods further efforts will be made to achieve prediction accuracy above 80%.

Gábor ILLÉS and Tamás FONYÓ

Assessing the expected impact of climate change on forest yield potential in the AGRAGIS project...25–34

Abstract – Climate change requires actions from political, social, economic, and scientific stakeholders. The AGRAGIS project during the development of National Adaptation Geo-information System aimed to assess the climate change induced potential impacts on yield conditions of forests. During the project on the basis of the historical meteorological database of the country (CarpatClim-Hu), and using the ALADIN and RegCM regional climate models we have assessed the expected forest climate zone shifts in Hungary. Yield data of forests as a baseline came from forest stands that were established in the early 1960s, which are being now the 6th age-class. Yield data for forests under changed conditions came from forest stands that were established in the early 1990s, which are being now the 3rd age-class. Climate change facts between the periods of 1961-1990 and 1991-2010 can be statistically evaluated in this way together with yield changes of forest stands. By the projection of average statistical differences according to site we can assess the expected changes in yield potential for future time windows of 2021-2050 and 2071-2100. Results showed that a drop is expected for all major species' yield potential to different extent under future climate conditions.

Balázs GARAMSZEGI and Zoltán KERN

Basal area growth trends of Hungarian beech forests in a changing climate...35–44

Abstract – Multidecadal trends of mean basal area increments of beech from three sites and four different stand ages were investigated in Western and Northern Hungary. Regardless location and age, our findings show a slowdown in growth or even significant increment decrease for the past 30-40 years. Although the phenomenon is connected to unfavorable changes of climatic conditions, no clear linear relationship can be detected between the decadal trends of increments and the widely used forest aridity indices.

Gergely JANIK, Anikó HIRKA, András KOLTAY, János JUHÁSZ and György CSÓKA

50 years biotic damage in the Hungarian beech forests...45–60

Abstract – We examined the database of the Forest Research Institute derived from the reports of the forest-managers. We indicated the important pest and pathogen damage areas from the last 50 years. We also compared the data to drought-indexes. The frequency and severity of damages increased from the mid-1980's. The beech-decline occurred on larger areas, if the values of the drought indexes were above certain values in the predecesing 2 years.

Ernő FÜHRER, Márton EDELÉNYI, Anikó JAGODICS, László JEREB, László HORVÁTH, Zoltán KERN, Andrea MÓRING, Ildikó SZABADOS and Zoltán PÖDÖR

Effect of weather conditions on the annual basal area increment of a beech stand of old age...61–78

Abstract – We studied the effect of meteorological parameters on the basal area increment (BAI) of a beech stand in the Sopron Mountains between 1985 and 2007. We evaluated the meteorological conditions of the area by using breakpoint-analysis, and the results showed

rising temperature and decreasing rainfall in certain months of the vegetation period. Regarding to the trends of BAI, we observed a significant decrease in the main growth period (May–August) and a significant increase in the final growth period (September–October), while the annual tree growth showed a strong significant decreasing trend. Multivariate regression analysis was used to determine the relationships between the BAI and the climatic variables in the given and also in the previous two years. We found that the previous year's precipitation has positive, while autumn temperature has negative effect on the BAI. At the same time current spring to early summer precipitation enhances the beech growth, and in contrary, the mean temperature in June and July has negative effect on the BAI. Based on the results, we can conclude that according to the forecasted changes in climate, not only further loss in growth but also drastic decay in vitality and tolerance can be expected for beech at this site in the future.

Éva KONKOLY-GYURÓ and Pál BALÁZS

Forest cover change in the Carpathian Basin from the mid 19th century till nowadays...79–97

Abstract – Human impact on landscape might be followed by the assessment of land use and land cover change. In the project „200 Years of Land Use and Land Cover Changes and their Driving Forces in the Carpathian Basin in Central Europe” founded by the NASA Land-Cover/Land-Use Change Science Program, a GIS dataset on the historic land cover, of a nearly 350.000 km² area has been provided. Four time layers, based on historic maps and CLC data have been assessed by GIS and statistical methods. The focus of the present paper is the forest cover change amongst the results of the land cover transformation processes. The main tendencies of changes of the entire study area and the specificities of the main landscape types are being presented here.

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Gábor ÓNODI

Habitat transforming effects of non-native and invasive tree species...101–113

Abstract – The spread and habitat transformation effects of invasive plant species cause global environmental problems. In Hungary occurring invasive tree species, such as black cherry, common hackberry, russian olive, black locust, tree of heaven, boxelder and green ash, can transform native communities and architecture of habitats considerably. These species have usually less consumer species comparing to native tree species. Their pests can be introduced with them as well, which can also become invasive. Tree rot fungi can colonize them slower, so that less diverse microhabitats would form on them, and so less species would inhabit them. Habitat transformation can be facilitated by antropogen influences further, such as soil works, deforestation and river control. Climate change can influence the range and occurrence patterns of both native and alien species. Alteration of native communities could be so intensive, that habitat restoration would be much source and work intensive, even if it would be possible.

Ádám SILNICKI, Gergely ZAGYVAI and Dénes BARTHA

Comparative surveys on vegetative organs of hungarian ash (*Fraxinus angustifolia* Vahl subsp. *danubialis* Pouzar) and common ash (*Fraxinus excelsior* L.)...115–125

Abstract – The aim of present study was to discover the morphological variety of vegetative organs of two native *Fraxinus* species (*F. excelsior*, *F. angustifolia* ssp. *danubialis*) and to separate different taxa and hybrids through their vegetative morphological characteristics. Studied populations were originated from Rábaköz – Répce-plain area, Sopron-Hills and Gemenc. During statistical analysis multivariate statistical methods were applied such as Principal Component Analysis (PCA) and Principal Coordinates Analysis (PCoA) to demonstrate the correspondences between morphological characteristics and specimens. As a result of statistical analyses *F. excelsior* specimens separated significantly from the sample group consisted of specimens identified *F. angustifolia* ssp. *danubialis* and hybrids. Most of measured morphological variables proved to be highly distinctive in the case of above mentioned two sample groups, if they were applied collectively. Strongest distinctive features between *F. excelsior* and mixed group were the width variables of leaflets and leaflet teeth density, although these variables proved to be unsuitable for separation of hybrids.

Dénes MOLNÁR, Iván BARTON, Kornél CZIMBER, Tamás BAZSÓ and Norbert FRANK

Investigations on stand structure in the Roth memorial forest...127–136

Abstract – During transformation of even-aged forests to selection forests it is important to follow the changes in stand structure. Detailed forest mapping was made in Sopron 182 B experimental selection forest, where the research was started by Roth Gyula in 1936. The main purpose of the survey was to create a database which can be used for timeline analysis in the future. We developed a survey method which is accurate enough to generate spatial forest stand databases. We made a 3D model of the forest and examined its structure. During the decades of the experiment beech became dominant, light-demanding tree species withdrew to upper canopy regions. Diameter and height distribution is heterogeneous, in some areas it shows the characteristic of selection or structurally differentiated forests.

Tivadar BALTAZÁR, Ildikó VARGA and Miloš PEJCHAL

Distribution of European mistletoe (*Viscum album* L.) according to the location of host species in the castle park of Lednice, Czech Republic...137–150

Abstract – The aim of this study was to examine the distribution of European mistletoe (*Viscum album*) in the castle park Lednice, Czech Republic studying the dependence of the infection intensity and location of host species. From the most common host species (23) more than 1600 infected individuals were involved in the analysis. Based on our results it can be concluded that the host species are infected differently, since some hosts (e.g. *Acer saccharinum*, *Acer sacharum*, *Juglans nigra*) are more sensitive to the presence of mistletoe and these woody species are much heavily infected. Our results also show that the relationship between the tree location and the intensity of mistletoe infection is statistically significant. It means that solitary trees are most heavily contaminated with mistletoe. Furthermore, those individuals are less endangered, which are situated in closed canopy groups. Nevertheless, the ratio of uninfected and infected individuals are almost the same in case of solitary trees or in different canopy groups too.

Bálint HORVÁTH

Zoogeographical characteristics of the nocturnal macrolepidoptera fauna of sessile oak-hornbeam forests in the Sopron Mountains...151–159

Abstract – The Lepidoptera fauna of the Sopron Mountains is well known; more than 800 species was published. The oak forests have high importance in the region, because they support a high species richness of Lepidoptera. Macromoths which occur in sessile oak-hornbeam forests in the study area are classified in five larger faunal types. The most important are the Trans-Palaearctic, West-Palaearctic and “Siberian” species from which the Euro-Siberian, Holomediterranean and Boreo-Continental faunal types compose the basic fauna. Moreover, several further faunal elements are known from the Sopron Mountains, such as South Continental and Extra-Palaearctic species, furthermore other Mediterranean and Boreal components.

Ferenc JÁNOSKA, Péter KEMENSZKY, Attila FARKAS, József VARJU and Zsolt HORVÁTH

Artificial nest predation investigations at a varied habitat in Somogy County, Hungary...161–173

Abstract – We made artificial ground nest predation investigations at a varied habitat in Somogy County, Hungary. During the investigation we were interested in determining which predator species pose a potential risk for the nests of small game species (pheasant and grey partridge) in a territory, where the habitats are suitable for both small game and big game. We monitored 20-20 artificial ground nests in April and May. In each nest we put 2 chicken eggs, 1 wax egg and 1 plasticine egg, respectively. We placed the artificial nests at the edge zones of different habitats and checked the predation every 4 days. We found the Red Fox (*Vulpes vulpes*) (51%) and the Wild Boar (*Sus scrofa*) (37%) to be the most common predator species. We found in April the highest predation at the edges between the Alder forests and crop fields and the Alder forests and pastures and in May at inner micro edges of young afforestation, the differences were significant. The predation risk was also very high for artificial nests left at inner micro edges of young afforestation for 2 months, but the differences between the study periods were not significant.

Dániel HÁMORI

Conservation biological aspects of the little owl (*Athene noctua*, Scopoli, 1769) adapted to anthropogenic nesting environment, Upper-Kiskunság, Hungary ...175–187

Abstract – The Little Owl (*Athene noctua*) is a strictly protected species that avoids closed forests. The species originally nested in cavities in the trunk and branches of decaying trees. These natural nesting sites have become extremely scarce so the species have switched to an anthropogenic nesting environment where potential nesting hazards associated with the presence of beech martens (*Martes foina*) (74 %), with electrocution risk by uninsulated medium-voltage power-lines (51 %) and with danger of poisoning by rodenticides (32 %) may occur. During the period covered by the present study (2003-2015) nearly 400 artificial Little Owl nest boxes were installed in the Upper-Kiskunság region and a total of 467 birds (adult and pullus) were ringed. It can be safely assumed that the growing nest box occupancy rate in recent years indicates a rise in population. By 2015, nest box occupation rate had risen to 25,4 %. The present study, besides outlining the conservation solution of artificial nest boxes in the short term, proposes a suggestion for a long-term solution based on international practice by restoring the natural nesting environment for Little Owls.

Zoltán VARGA and Attila FARKAS

Examination of food of badgers (*Meles meles* L.) in Komárom-Esztergom county, Hungary...189–197

Abstract – In the 2009/2010 hunting season 77 badgers were collected in the territory of Komárom-Esztergom county. Some of the animals were legally hunted specimens, but the 41.5% of sample resulted by road accidents. On the samples, analysis of dietary habits was performed, which was accomplished by analysis of stomach contents. The results were evaluated separately according to habitat types and seasons, based on location and time of the killing, or inventing. We examined the relative frequency of occurrence and diversity of food items in stomach contents, as well as trophic niche breadth and standardized trophic niche breadth of badgers. We intended to reveal the occurrence of small game species in badger's diet and differences in feeding habits between the various habitats and seasons. The studies have shown that feeding habits of badgers living in different habitats and collected in different seasons differ significantly based on consumption frequency of certain food categories. However, the presence of small game species in the diet of badgers has not been proved. We found that on the test area badgers are feeding generalist species, with periodic specialist features characteristic only in certain habitats.