

FAGUS 2010

INTERNATIONAL SCIENTIFIC SYMPOSIUM

“IS THERE FUTURE FOR BEECH – CHANGES, IMPACTS AND ANSWERS“

„Ima li bukva budućnost – Promjene, Utjecaji i Odgovori“

„Van-e jövője a bükknek a régióban? – Változás, Hatások és Válaszok“

October 27th – 28th 2010 Varaždin, Croatia

October 29th 2010 Zala County, Hungary

Under the patronage of:



EFI ASSOCIATED EVENT

SUMMARY

November 2010

CFI

1. INTRODUCTION

Croatia and Hungary are neighbouring countries which both share long common tradition. Belonging to the same geographical region and sharing common natural heritage, history and cultural environment, due to historical reasons both countries share also the similar approach to forest science and management based on principles of German forestry school adopted centuries ago.

With already existing good relations between the Croatian Forest Research Institute CFI and the Hungarian Forest Research Institute ERTI, the Institutions developed the idea of organising a joint scientific meeting on a species that is also in the forms of interest in both countries, with regard to expected climate changes: beech (*Fagus sylvatica* L.). The species is of great relevance for forestry and national economies of both countries. Habitat conditions and ecological circumstances are similar and beech is in similar way affected by climate. By signing the agreement on joint organization of the international scientific Symposium on beech, entitled: "FAGUS 2010: *Is There Future for Beech – Changes, Impacts and Answers*" on February 5th 2010 in Varaždin, Croatia the two Institutions put a ground stone to what later turned out to be acclaimed international scientific meeting on beech, generously supported also by the IUFRO WP 1.01.07 on Ecology and Silviculture of Beech and by the EFI, who both contributed with their patronage to the networking and global response of researchers and scientists.

2. FAGUS 2010 ORGANISATION CONCEPT AND PUBLICATIONS

Further to the Agreement on joint organisation of the FAGUS 2010 Symposium between the CFI and ERTI, the CFI took the responsibility of technical issues, organization of the two-day scientific conference in Varaždin as well as the editing tasks and publication of the FAGUS 2010 Book of Abstracts; while ERTI along with the Editorial Board of the *Acta Sylvatica & Lignaria Hungarica* and prof.dr. Csaba Mátyás (University of West Hungary Faculty of Forestry in Sopron) provided organization of the one-day Field-Trip in Hungary and assured the papers publication as the special edition of ASLH scheduled for end 2010.

The total number of submitted abstracts for the FAGUS 2010 Symposium which passed the revision was 65, whereas 44 authors applied as oral presenters of their papers while 19 authors applied for poster presentations. For all abstracts adequate language review and translation was assured to both Croatian and Hungarian language thanks to the courtesy of the organizer Institutions. Further to that the total of Abstracts in all three official languages of the Symposium (English, Croatian and Hungarian) was published as the trilingual "FAGUS 2010 Book of Abstracts" which was distributed as a hardcopy of 212 pages among the Conference participants in Varaždin on October 27th 2010.

All submitted full papers have undergone an anonymous reviewing process by the members of international scientific community with confirmed expertise within the specific field of forestry science. The reviewing process was assured by the Editorial Board of the ASLH with prof.dr. Csaba Mátyás, and by CFI which initially coordinated the receipt of the papers and 1st phase of their review. Hereby we would like to express our most sincere gratitude to all the reviewers who generously offered their assistance in the reviewing process of FAGUS 2010 papers, some of which were also the participants of the FAGUS 2010 Symposium.

3. FAGUS 2010 SYMPOSIUM

The Symposium scheduled for October 27th – 29th 2010 was organised as a 3 days meeting, with a conference part in duration of two days and organised by the Croatian Forest Research Institute CFI in the venue of Hotel Turist in Varaždin, Croatia from October 27th – 28th 2010; and one day field trip organised by the Hungarian Forest Research Institute ERTI in Zala County, Hungary on October 29th 2010.

From the Croatian side the Symposium was supported by the Academy of Forestry Sciences, Ministry of Science, Education and Sports, Croatian Forests Ltd., Croatian Chamber of Forestry and Wood Technology Engineers, Croatian Forestry Society, and Croatian Forest Extension Service,.

From the Hungarian side the Symposium was supported by the Ministry of Agriculture and Rural Development, Zalaerdő Forestry Company Ltd., Forestry Commission of the Hungarian Academy of Sciences, Faculty of Forestry University of West Hungary, and Hungarian Forestry Association.

Yet the key support was assured by the IUFRO WP 1.01.07 on Ecology and Silviculture of Beech and by the European Forestry Institute (EFI) which both contributed immensely with their patronage to the networking and global response of researchers and scientists and their participation at the FAGUS 2010 Symposium.

3.1 FAGUS 2010 CONFERENCE

From the total number of authors who announced their participation at the FAGUS 2010 Symposium, on 2 days conference in Varaždin which started on October 27th 2010, 28 authors presented the results of their research orally, while 16 authors presented the results of their research in form of poster presentations. Active participants represented 14 countries: Bosnia and Herzegovina, Czech Republic, Croatia, France, Germany, Hungary, Iran, Japan, Poland, Serbia, Slovakia, Slovenia, Sweden, and Turkey.

The conference which was officially opened with the plenary speech of prof.dr.Csaba Mátyás on "*Future of beech in Southeast Europe from the perspective of evolutionary ecology*", was organised in two work days according to the groups of lectures, each moderated by the group of 3 scientists–active participants of the FAGUS 2010 Symposium. Simultaneous trilingual translation was provided for all attendants of the Conference

After the presentations participants were encouraged to actively contribute to the conference by questions to authors, joint discussion or by sharing their experience regarding the specific topics. The complete list of presented papers in form of oral presentations and posters is provided at the end of this summary.

Due to the national supports of the Croatian Forests Ltd. and Croatian Chamber of Forestry and Wood Technology Engineers from the Croatian side, and the Zalaerdő Forestry Company Ltd. from the Hungarian side, high interest for the participation at the FAGUS Symposium was shown also by professionals from practice and Institutions dealing with forest management-

3.2. FAGUS 2010 CONFERENCE CONCLUSIONS

At the end of the last group of presentations in the afternoon of the October the 28th 2010 the participants were encouraged to open active discussion on papers presented during the 2-days FAGUS 2010 conference, covering a wide range of topics such as genetics and ecology of beech forests, silviculture of the species and its production potential, further on management and adaptability potential which is especially important with regard to climate changes. By presenting the results of different studies through papers and posters the meeting encompassed variety of topics related not only to beech in European context, yet as a species generally and globally. This provided overview on its ecological constitution, eco-physiological properties and calamities, biotic and non-biotic factors affecting the species, the genetic variability and potential, reforestation possibilities and silvicultural procedures, of growth and increment, and regeneration possibilities.

For the final word of the Conference doyens of forestry science attending the FAGUS 2010 Symposium were invited, whose contribution to the conference was of decisive importance:

- prof.dr. Csaba Mátyás (Faculty of Forestry in Sopron, University of West Hungary)
- prof.dr.Ladislav Paule (Faculty of Forestry, Technical University, Zvolen, Slovakia), and
- dr.Joso Gračan, (one of the pioneers of forestry genetics in Croatia, and former director of then Forest Research Institute Jastrebarsko (now CFI), Croatia)

Further to the presented papers during two days of the FAGUS 2010 conference, all three key-speakers agreed that according to the predictions of forestry experts and yet evident manifestations of global climate change, the forests are already affected. This will surely become even more evident in upcoming years. Due to decline of genetic diversity it is unclear how the trees will adapt to climate change, especially in such short terms as in one generation only; neither which are actual limits of

genetic adjustment according to which the species can respond to climate change, nor to which extent the actual habitat and environment change could be tolerated by the species. What is certain is that the ability of species adaptation will become the key-factor of their survival. Adaptation potential directly puts genetics into focus.

As explained by prof.dr.Mátyás, for the European beech (*Fagus sylvatica* L.) there is optimism shared by some experts regarding the adaptation potential of this species, supported by the arguments that most of the its' genetic diversity rests *within* populations, that genetic system and diversity of beech trees can cope with the current changes, that phenotypic plasticity of the trees is relatively high, and that the existing gene-flow does helps to exchange favourable genes across large distances.

On the other hand pessimists argue that the migration rate is too slow, that there is insufficient genetic diversity, that the landscape fragmentation prevents further colonisation, and that a general breakdown across the whole distribution area is expected.

Consequently, what is overlooked is that the possible shifts are far too rapid making the adaptability not present at this moment practically ineffective, that the gene-flow and migration are practically irrelevant here, and that the selection process and plasticity of the species should be more carefully studied instead of gene flow and migration.

As emphasised by prof.dr.Mátyás, in such circumstances and according to the modelled scenarios, the answer to the fundamental question of the FAGUS 2010 Symposium on the future of beech is that the species is expected to go in direction of retreat following climatic changes in numerous countries (Hungary, France, Slovenia, Iran, Turkey). Low elevation occurrences along the Southern border of its distribution (i.e.the "xeric-limit") are especially threatened. At the same time the progress of further colonisation is expected in Northeast of Europe (Poland).

Regarding the productivity and the experienced yield, what is certain is that with the increasing temperatures, an acceleration of growth and increment can be expected only in areas where the temperature is the limiting factor. If the water-holding capacity of the soil and the amount of precipitation is limiting, the climatic change will surely bring to the loss of increment and net production.

Changes in regeneration and the dynamics of ecosystems are also expected, where the status of beech in forest ecosystems will change depending on the stress factors. The most critical phase in species life-cycle s regeneration; therefore special care is crucial in order to eliminate the obstacles of regeneration, or to support the process artificially (planting)

Consequently adaptation measures in forestry are necessary and essential. Expected changes are too fast to be buffered by natural spontaneous processes, therefore human support in maintaining ecosystems stability and respective revision of forest management strategies should be urgent and are important now more than ever.

Prof.dr.Mátyás emphasised that climate change brings up series of new challenges not only in the field of practical management but also with regard to re-thinking of century-old dogmas serving as basis of traditional silvicultural activity. The forestry community faces a difficult task not only regarding the timely re-formulation of basic principles but also to find the proper communication means toward the public and the politicians where short-term and emotional thinking still prevails. This is heavy task noone else will accomplish on behalf of the forestry professionals.



Participants of the FAGUS 2010 Conference in Varaždin, Croatia. October 28th 2010

3.3. POST-CONFERENCE ACTIVITIES

After the sessions and the official closure of the conference, the facultative guided tour through Varaždin and visit to the unique interactive Entomological Museum of Varaždin was organised. The participants positively evaluated the course of the FAGUS 2010 conference same as the selection of topics, presenters, papers and the key-speakers.

4. FAGUS 2010 FIELD TRIP TO HUNGARY

After the official conclusion of the 2-day scientific-conference in Varaždin, in the morning of October the 29th the participants departed to the field trip to Zala county, Hungary supported by the Zalaerdő Forestry Company Ltd-

The programme started with visit to the National Forest Reserve of Vétyem an 190 years old beech forest. This forest association is typical on the brown forest soils in South Zala beech forest region. Typical species alongside the common beech are the European hornbeam (*Carpinus betulus*), sessile oak (*Quercus petraea*), sycamore (*Acer pseudoplatanus*), field maple (*Acer campestre*) and European alder (*Alnus glutinosa*). The understory vegetation includes Hart's tongue fern (*Phyllitis scolopendrium*), spinulose wood fern (*Dryopteris carthusiana*), goat's beard (*Aruncus dioicus*), mezereon (*Daphne mezereum*), cyclamen (*Cyclamen purpurascens*) and sword-leaved helleborine (*Cephalanthera longifolia*). The trees in Vétyem reservation are outstanding considering their sizes and annual increment. (height 50m, current increment 27m³/ha/year, standing volume 1300 cu.m.) Last cut was carried out approximately 30 years ago. Prior to that the management regularly included professional work corresponding to the age, structure and condition of the stand. The ancient beech forest is maintained to serve two important purposes: to carry out research in an unmanaged forest (growth, mortality, stem number changes without thinning, etc.) and to become a unique pristine forest in Hungary open for experts and the general public.

Stop at the Management Trial Tormafölde was interesting from various aspects: the thinning experiment established in 1965, with consecutive thinnings made in 1966, 1976, 1982, 1993/94 and 2003, and the control that have been left unmanaged, was an example of different thinning methods applied from the strong to the moderate thinning.

Third stop featured the international provenance trial *Bucsuta*. In the frame of the second series of the international beech provenance trials, 36 provenances were planted in 3 repetitions with a total of 5100 plants in spring 1998. Prior to establishment, the site was occupied by a 31 year old spruce stand, damaged by snow brake, bark-beetle and game, which was clearcut in autumn 1997. In addition to 33 foreign provenances received from Hamburg, 3 Hungarians were included. Next to the international provenance trial, a large-plot comparative field trial was set up with 7 Hungarian and 1 Transylvanian provenances, which has not been evaluated yet.

The site raised special interest among the international participants of the field trip, seeing on the location their own provenances and comparing the growth data of provenances in Bucsuta (as measured in 2010) with the performance in their home countries.

To and from Bucsuta, the participants were transported on the local narrow-gauge forest railway Csömödér that encompasses the length of 109 km across the forests of Zala. It delivers significant amount of wood to Lenti and to the wood processing firms in Csömödér.

Last stop was a visit to beech forests in the vicinity of Zalaegerszeg (Csács forest district) where large-scale mortality was triggered by the droguhts 2000-2003. The extreme weather conditions weakened the vitality of beech and led to a mass gradation of beech jewel beetle (*Agrius viridis*). In total, close to 100 tsd. cu.m. of sanitary cutting had to be carried out. As the beech forests are at their xeric limits, the decision was taken to regenerate with other tree species, mainly sessile oak. The participants visited both damaged and surviving stands (showing scars of beetle attack) as well as successful artificial regenerations. The field trip ended with a social field barbecue in a beech stand.

5. CONCLUSION

The joint organization of the FAGUS 2010 Symposium is the result of successful bilateral relations between two scientific institutions: Croatian Forest Research Institute (CFI) and the Hungarian Forest Research Institute (ERTI) which both recognized the importance and role of beech today as well as in future. Thanks to the support of IUFRO WP 1.01.07 on Ecology and Silviculture of Beech and the European Forestry Institute, which contributed with their patronage to the successful organization of the FAGUS 2010 Symposium, both organizing Institutions strengthened already present good relations and confirmed their position within the forestry science.

At the same time, it became evident that the discussed problems of beech are by no means confined to these two countries, rather being a larger regional (SE-European and Near East) problem. The future stability of beech forests along their xeric limits serves as a unique case study for a phenomenon which has global implications: how zonal forests may be hit in the near future by climatic changes. There are globally few examples where this process has been addressed with similar clarity. This fact lends the meeting a truly international character which was acknowledged by the foreign participants. In this respect, FAGUS 2000 truly accomplished its aims.

6. ACKNOWLEDGEMENTS AND CONTRIBUTIONS

Herewith the Institutions organizers would like to thank all the involved and previously mentioned national and international Institutions, companies and individuals who contributed to the success of the FAGUS 2010 Symposium; Your support; assistance, suggestions, and feedback were crucial and of extreme value. Yet above all the greatest gratitude we want to express to the very authors, without your contributions FAGUS 2010 surely wouldn't accomplish its aims.

The complete list of papers presented at the FAGUS 2010 Symposium in form of oral presentations and posters is as follows:

List of paper presentations

1. Kutnar L., Kobler A.
How could climate warming affect beech forests in Slovenia?
2. Führer E. , Horváth L., Jagodics A., Machon A., Szabados I. ,
Application of aridity index in forest practice
3. Seletković I. ,Potočić N., Jazbec A., Čater M., Ugarković D. Pernar R., Seletković A., Šango M.
Eco-physiological response of common beech (Fagus sylvatica L.) under changed stand and climate conditions in Croatia
4. E.Silva D., Legay M., Badeau V., Corcket E., Dupouey J.L.
Plants communities help to detect human impact on distribution range of tree species. The case of European beech at its range margin
5. Yilmaz M.
Is there future for the isolated relict population of oriental beech (Fagus orientalis Lipsky) in southern Turkey?
6. Legay M. , Sardin T.
Beech silviculture in the continental part of France: which guidelines in front of climate change?
7. Sulkowska M.
Genetic and ecotype characterization of European beech (Fagus sylvatica L.) in Poland
8. Marjanović H. , Ostrogović M.Z., Paladinić E., Balenović, I., Indir K., Vrbek B.
First estimates of carbon stocks by pools in beech-fir forest stand in Croatia
9. Klopčić M., Bončina A.
The dynamics of European beech (Fagus sylvatica L.) silver fir (Abies alba Mill.) forests in the last 110 years
10. Fallahchai M.
A study of gaps regeneration as a result of single selection cutting in fagus stands in north forests of Iran

11. Matyas C., Bogdan, S. , Božić, G. , Gömöry, D., Herke, Z. , Ivanković, M
Experiences regarding the juvenile adaptive potential of beech based on provenance trials in SE Europe
12. Özel H.B. , Ertekin M., Yilmaz M., Kirdar E.
The factors affecting the success of natural regeneration practices in Oriental beech (*Fagus orientalis* Lipsky.) forests in Turkey (Bartın-Sökü case study)
13. Yilmaz M., Özel H.B., Çalişkan S.
The relationship between beechnut physiology and natural regeneration in beech forests
14. Dubravac, T. , Dekanić S.
Some results from the 30 year long observations of the stand structural dynamics in the thinned forest stand of beech (Fagus sylvatica L.)
14. Perić S. , Tijardović M.
Nursery production of common beech seedlings during last 10 years in Croatia
15. Dobrowolska D.
Variability of European beech (Fagus sylvatica L.) at the border of its natural range in Poland
16. Csóka G., Lakatos F., Koltay A., Hirka A., Janik G., Molnár M.
Health status of the Hungarian beech forests
17. Kitamura K., Matsui T., Kobayashi M., Saitou H., Namikawa K., Tsuda Y.
Genetic relationships among small populations of Fagus crenata scattered beyond the northernmost distributional front in Japan
18. Miyazaki Y., Joseph B., Kobayashi M., Hiura T., Hirokazu K., Shimizu K., Satake A.
Role of nutrient on flower bud differentiation in Japanese beech (Fagus crenata): exploring mechanism of masting by flowering gene expression
19. Gomory D., Paule L., Comps B., Wühlisch G.v.
Diverging patterns of neutral and adaptive genetic variation in common beech (Fagus sylvatica L.)
20. Božić G.
Genetic structure of Fagus sylvatica L. seed stands from different altitudes of mount Gorjanci as revealed by isoenzymes
21. Ivanković, M., Bogdan S., Gradečki-Poštenjak M., Popović M., Katičić I.
Genetic variability of the European beech provenances from the Southeastern Europe
22. Novak-Agbaba S., Gradečki-Poštenjak M., Čelepirović N
Variability of qualitative properties of the beech nuts (Fagus silvatica L.)
23. Poljanec A., Bončina A.
Characteristics of diameter growth of European beech (Fagus sylvatica L.) in Slovenia
24. Novotny V., Balenović I., Medenjak N., Štorga D., Pošta D.
Research on structure of older and old common beech stands in management unit Đurđevačka bilogora
25. Benko M., Štorga D., Županić M., Indir K., Medenjak N.,
Common beech forest on Kalnik mountain
26. Sheykholeslami, A., Kazemnezhad, F.
Measurement of bark of beech in Tosakoti forests in the Hyrcanian forest
27. Prka M., Krpan A.
Impact of sustainable management of natural beech stands on assortment structure of beech in felling sites of central Croatia
28. Koprivca, M., Matović B., Čokeša V., Stajić S.
Quality and assortment structure of the volume of beech high stands in Serbia

List of poster presentations

1. Ernst van der Maaten *Climatic impacts on intra- and interannual radial growth of beech at different expositions in Southwestern Germany*
2. Ingrid Stjernquist *Development and nutrient allocation to beech seeds (Fagus sylvatica L.) in relation to soil characteristics*
3. Krunoslav Arač *Decay fungi on living beech (Fagus sylvatica L.) trees*
4. Linda Bjedov *Abundance of small rodents in beech (Fagus sylvatica L.) forest of mountain Ivanščica (Croatia)*
5. Matěj Pánek *Phytophthora spp. causing diseases of European beech in the Czech Republic*

6. Miloš Koprivica *Estimates of high beech stand biomass in Serbia*
7. Mustafa Yilmaz *Beechnut sizes and weights of 14 Different oriental beech (*Fagus orientalis* Lipsky) provenances*
8. Piotr Markiewicz *Growth and leaf phenology of European provenances of beech in Poland*
9. Qingmin Han *Response of internal conductance to soil drought in sun and shade leaves of adult *Fagus crenata**
10. Rémi Wortemann *Variability of the vulnerability to xylem cavitation in European beech provenances*
11. Safet Gurda *Potentials and possibilities for utilization of beech (*Fagus sylvatica* L.) forest biomass in Bosnia and Herzegovina*
12. Seyed Maziar Razavi *Identification of relationship between some physiographic attributes and physicochemical properties and plant ecological groups in Fagetum forests, North of Iran*
13. Srđan Stojinić *Variability of physiological parameters of different European beech provenances in international provenance trials in Serbia*
14. Tamara Jakovljević *Reliability of results for measurement of total nitrogen in the Common Beech leaves (*Fagus sylvatica* L) for determination of nutrient status*
15. Urša Vilhar *Effect of forest management practice on carbon stocks in beech stand in SE Slovenia*
16. Željko Zgrablić *Traditional production of beech charcoal (*Fagus sylvatica* L.) at Čičarija mountain (Croatia)*

In Jastrebarsko, Croatia
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CFI¹

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