



The 1st workshop of the NECLIME working group on fossil wood

Brno, June 5-8, 2013

Report

(Dimitra Mantzouka, Torsten Utescher)

The 1st Workshop of the NECLIME working group on fossil wood took place at the facilities of the Mendel University, Faculty of Forestry and Wood Technology in Brno at the Building P, Lecture room P220 , and – as it has been underlined from all the participants - this was the best choice for such a meeting since this Lecture room was fully equipped with microscopes for every one of the participants and also with a microscope connected to the projector which could show in real time what the presenter was seeing under the microscope. This microscope was used especially at the last 10 minutes of some of the presentations. The participants had also the opportunity to discuss about their findings, since they were able to see under the microscope the original slides of every one during the coffee-breaks and also after the lunch, a process of inestimable value.

The level of the hospitality and care which has been shown from the organizers (Jakub Sakala & Vladimír Gryc) to each and every one of the participants was amazing! The organizers of the meeting did not require a fee for the participation of the meeting, although the organization was excellent and the expenses for the coffee breaks, the lunches and the official dinners have been covered entirely by the organizers.

The establishment of the **NECLIME WORKING GROUP ON FOSSIL WOOD** through this very first meeting is a fact. The NECLIME working group on fossil wood is really promising while it can be truly effective and fruitful not only for the participants but also for the whole xylotomical community.



Thursday, 6/6/13

Topic: Problematic wood types with wide rays (Fagaceae, Platanaceae, Icacinaceae) from the Tertiary of Europe [presented by S. Iamandei]

This presentation was focused on the problems of the validity of the morphotaxa assigned to the families Fagaceae, Platanaceae and Icacinaceae, after giving a review and the correct diagnosis of the identification of the families under the microscope. Stanila Iamandei has underlined the fact that in Fagaceae there are recent revisions, except for *Lithocarpoxydon* that he believes invalid. In Platanaceae, he has put under question the relation of *Spiroplatanoxylon* with *Plataninium* and some *Icacinoxylon* species, while he has put general question marks also in *Platanoxylon* and *Plataninium*. In Icacinaceae, he underlined the fact that a recent revision is needed as long as the correction of some identifications, and the survey of the validity of some taxa. During the discussion, J. Sakala has underlined the importance of the correlation among the organs of the fossil plants ('whole plant approach', e.g. *Spiroplatanoxylon* with *Platanus neptuni*).

Topic: Fossil lauraceous wood with special reference to the Petrified Forest of Lesbos Island (early Miocene, Greece) [presented by D. Mantzouka]

The first part of this presentation was focused on an overview of the fossil flora of Lesbos island according to each plant fossiliferous locality, on the differentiation of the preservation types and of the taphonomic conditions, while the second part of it has been related to the new findings at the Southern part of the island and especially at a new proposal of a methodology based on the occurrence of the oil and / or mucilage cells, which was used for the botanical affinities of the *Laurinoxylon* specimens from Lesbos island.



Topic: Fossil palm stems - overview and perspectives [presented by R. Thomas]

This presentation was focused on palms (Arecaceae), their standardization of the description and their interactive identification, current distribution etc. through the website 'Xper²' which Romain Thomas has presented to us. This freely accessed website 1) <http://www.infosyslab.fr/lis/?q=en/resources/software/xper2> and 2) <http://www.infosyslab.fr/Palm-ID/> along with the software which accompanies it, can be a significant tool for the identification of the living (modern), while in the near future it can host the fossil record as well.

Topic: Overview of the Tertiary woods of China [presented by Y-M. Cheng]

Yeming Cheng had presented the overview and the advance in research on Cenozoic angiosperm woods of China. At the beginning he had made an overview by showing the first references since 1933, and then the continuation of the work on fossil woods in the Wuhan and Yuanmou Neogene areas until now. He had also shown the hominoid fauna findings from the same area, which is underlying the Pliocene layers, rich in plant fossils. This presentation was mainly focused on the new findings from Yuanmou and also from Hutiaotan, Wanpu, Xinhua while Y.-M. Cheng, apart from the description of the specimens, had given also their Nearest Living Relatives, along with the results of the palaeoclimate reconstruction using the Coexistence Approach.

Topic: Overview of the Tertiary woods of Poland [presented by M. Klusek]

The overview of the Tertiary woods of Poland was a really hard work which Marzena Klusek has made, using references from 1850 until today, written in German, Polish, and English. After the end of the presentation, there was the thought of publishing this overview in English in some scientific journal because of its importance for a broader xylotomical community.



Topic: Fossil wood from the Early Pleistocene of southern Primory'e (Russian Far East) - systematics and palaeoclimatic perspectives [presented by O. Bondarenko]

The presentation by Olesya Bondarenko included the list of the taxa identified from a Calabrian fossil wood record with special reference to 8 morphotypes which were assigned to new morphospecies the last decade. O. Bondarenko had presented also the methodologies for climate reconstruction based on 1) non precisely identified fossil wood specimens ('Growth ring Analysis – Angiosperm anatomical analysis) and on 2) the systematic affinities (NLR) of the fossil taxa ('Coexistence approach').

Topic: Comparative collections in Brno or short introduction to the extant Central European wood species (conifers & angiosperms) [presented by V. Gryc]

During this presentation Vladimír Gryc has shown the webpage for Wood anatomy (<http://thuja.mendelu.cz/und/sites/default/files/multimedia/woodanatomy/index.htm?jazyk=en>) of Mendel University where everyone can see the makro- and micro- characteristics of the modern wood from Central Europe. This webpage can also be a very important tool. After the presentation, V. Gryc had given a guided tour to the participants at the laboratory, explaining the facilities and the instruments in use of the Department of Wood Science.

Friday, 7/6/13

Before the first presentation, V. Gryc has made a very interesting presentation about the Czech Republic, Mendel University and the Department of Wood Science.

During the 'welcome part', Torsten Utescher has shown very important information about NECLIME (www.neclime.de), while he underlined its activities and publication of data (Pangaea: www.pangaea.de). Later on, J. Sakala showed the methodologies which are based



on fossil wood and are used for the reconstruction of climate and vegetation, categorized in those which need a taxonomic attribution: 1) Coexistence Approach-NLR, 2) IPR-vegetation analysis, and 3) Plant functional types (PFT) technique (partly) ('subjective'), and those which do not need a taxonomic attribution but are based on plant physiognomy or geochemical measurements ('objective'): 4) Wiemann's statistical model (+tree ring analysis, stable isotope etc.) .

Topic: Coexistence Approach and concept of the Nearest Living Relative [presented by T. Utescher]

T. Utescher has presented in a very detailed way the methodological background of the Coexistence Approach (CA) giving first a categorization of the approaches based on: 1) plant morphology and function (e.g. Leaf Margin Analysis – LMA, Climate Leaf Analysis Multivariate Programme – CLAMP, Wiemann et al.'s palaeoclimatic model) and 2) taxonomic ones based on interpretation of NLR (e.g., Coexistence Approach – CA, classical and calibrated). In his presentation he has focused on the benefits of the Palaeoflora Database as far as the NLR, the recent distribution and the climatic requirements are concerned while he underlined the fact that the Nearest Living Relatives are more precise with macroflora (species, genus level) when compared to microflora (genus, family level). Up to now, two NECLIME working groups are working on reliable NLR concepts of Cenozoic plants, and 2,700 NLRs are currently assigned to Cenozoic plant taxa, while the recent plant distribution is provided in collaboration with Chorotree (www.chorotree.de). The determination of the climatic requirements of NLRs is based on heterogeneous chorological materials, but considers the entire distribution area of the taxon, while the palaeoclimate reconstruction is possible with the finding of the Coexistence Interval. He gave solutions to possible ambiguous CA intervals and also presented the 'outlier concept' in this methodology, along with the list of the 'relics'. Finally he has shown the application procedure for the palaeoclimate analysis using also some examples. At the end of this presentation there was a



discussion for preparing a list of NLR according to the wood findings which was accepted by all the participants.

Topic: Wiemann's et al. palaeoclimatic model [presented by J. Sakala]

J. Sakala's presentation on 'palaeoclimatic and palaeovegetation reconstruction based on wood' had started from the potential of dicotyledons for the climatic reconstruction, palaeotemperature estimation and climatic prediction, giving also the references which were associated with this issue. Focusing on the statistical model by Wiemann et al. he had shown also some restrictions of the method which could lead to wrong results, like using a small number of fossil wood types. He had presented also very interesting 'intermediate' fossil wood types, while he concluded underlying the fact that the NLR's of some taxa may be wrong, so there is a need of re-evaluation of the original descriptions based on the thin slides and that this 'objective' statistical model has an important subjective phase which is the correct choice of the wood types. At the end of this presentation there was a proposed arrangement of a categorization of working places for the participants.

Topic: Plant functional types (PFT) technique and IPR-vegetation analysis [presented by T. Utescher and J. Sakala]

T. Utescher had started his part by giving the quantitative vegetation reconstruction NECLIME methods (IPR, PCS, and PFT approach), and also the main concept of PFT approach which is also used in vegetation modeling for defining biomes. He had underlined the fact that this method has a lot of advantages since it uses all the taxa (except 'aquatics'), zonal and azonal (without a distinction in between them), is employed in all climates, since it uses 'findings diversity' it reduces the taphonomical bias. On the other hand, it does not necessarily detect extrazonal associations, and is not calibrated with the modern vegetation, has no standardized biomization procedure, but allows a finer and more flexible subdivision



of types. He had also shown a list with PFT names associated with the species or the families of the plant fossils. The very last attempt for classifying 26 PFT's (the previous was with 15) for the reconstruction of Cenozoic biomes comes by Popova et al. (accepted).

J. Sakala had started his part by giving the main characteristics of IPR-Vegetation Analysis method (= semi-quantitative, fossil-based evaluation method which classifies the fossil floras in terms of zonal vegetation, it is applicable to leaf, fruit and pollen record and it has been applied on Neogene and Paleogene floras) along with the 'glossary', the main components of the zonal vegetation (CONIFers, Broad-Leaved Deciduous, Broad-Leaved Evergreen, SCLerophyllous, LEGume-like, Tree Ferns, Arboreal Palm, Zonal Herbs – Meso or Dry) in association with the features on which the 'scoring' is based (vegetation descriptions, floristic lists, e-floras, herbarium material, personal observations) and the transfer functions for the classification of the zonal vegetation types. The validation of this method is based on modern vegetation sites.

Topic: Intraspecific wood anatomical variability and climate reconstruction [presented by A. Boura]

Anaïs Boura has presented an approach of using the extant tree and the fossil wood anatomy for palaeoenvironmental reconstruction in an attempt of giving answers in questions like if the intraspecific wood variability can be explained by environmental and climatic parameter variations, or if there is a link between wood anatomy, tree growth and $\delta^{13}\text{C}$ using 181 modern trees from 13 sampling areas. At the second part of her presentation she was focused on giving her results to the question: 'which paleobiological and palaeoenvironmental hypothesis can be made regarding fossil wood anatomical structure' while she informed the participants for the establishment of the new xylotheque in the MNHN in Paris with 20,000 specimens of 218 families of modern wood from 78 countries from all over the world.



Topic: Wood anatomy – what for? Analyses of wood in archeological stands in Wroclaw, Poland [presented by E. Myskow]

Elżbieta Myskow started her presentation by giving the methods which are used according to the problems that have been faced because of the damages of the working material. The main focus of this presentation was the categorization of the identified species according to the usage of the tools and the wood characteristics which were ideal for this usage (e.g. durability), along with the reflections to the vegetation of the surroundings of the archaeological sites, while she has shown that the wood anatomy can also be of potential value for Crime Scenes Investigations.

Topic: Brno and its role in dendrochronological research [presented by V. Gryc]

V. Gryc has focused not only on dendrochronology but also on wood anatomy and xylogenesis. 3D models of modern wood species have been made for these purposes, with also the creation of sketches for the explanation of the xylogenesis' phases. After showing the preparation steps for the observation and the measurements of the material he was focused on the xylem formation.

Later on the participants enjoyed a walk in the centre of Brno and its sights guided by V. Gryc.

At the end of the meeting there was a discussion on the 'homeworks', 'expectations' and 'inspired collaborations' which could be done until the next meeting.

Among the proposals / agreements were the following:

- 1) Categorization of the responsibilities (for the purposes of fossil wood anatomy studies) in geographical distribution were preliminary proposed.**



- 2) It has been proposed that the link of Palm-ID (<http://www.infosyslab.fr/Palm-ID/>) and Xper² (<http://www.infosyslab.fr/lis/?q=en/resources/software/xper2>) can be connected and active also in Neclime official website.
- 3) There was an agreement of having the NECLIME MEETING ON FOSSIL WOOD ANATOMY every two years starting in 2013 (in order to have time to present new results and also to participate at the big palaeobotanical conference (EPPC and IOPC) in even-numbered years.
- 4) Among the places proposed for organizing and hosting the next NECLIME MEETING ON FOSSIL WOOD ANATOMY in two years (2015) are the following: Paris, Wroclaw, Bucarest or another city in Romania but there is not an agreement yet.
- 5) T. Utescher has already send to the participants a list for the proposed NLRs for receiving a feedback which could be really useful for the NECLIME Database and the usage of several methodologies.
- 6) J. Sakala has already send to the participants useful links for the NLR, for Wiemann's model and its application, for IPR-analysis, along with links for additionally information on Brno and Czech Republic sights and history.