

1st Announcement

DRAGON TREES

tertiary relicts in current reality

1st World Conference Focused on Dragon Trees



5 – 8 September 2019, Brno, Czech Republic

Only a few species among more than 60–100 species of *Dracaena* genus reach arborescent form. Arborescent dracaenas were classified into dragon tree group comprising following species: *Dracaena cinnabari*, *D. tamaranae*, *D. draco* s.l., *D. ombet* s.l., and *D. serrulata* s.l. spread in South Arabia, Macaronesia and North Africa. It is possible to count other species from Neotropics - *D. americana*, Asia - *D. jayniana*, *D. cochinchinensis*, *D. yuccifolia*, *D. cambodiana* and *D. kaweesakii*, and Africa – *D. ellenbeckiana* and *D. steudneri* to the dragon tree group due to its tree growth habit.

The significance of these group of species is given by many reasons, most important are:

1. Dragon trees are tertiary relict species, the ecosystems (woodlands and very rare forests) with these species belong to one of the oldest ecosystems around the world
2. Most species are endemic with limited (often island) distribution
3. The distribution of most species is scattered to the small population with unbalanced age structure, where often young trees are missing
4. Most species are endangered and listed in IUCN Red List
5. Natural regeneration of most species is endangered by overgrazing
6. Most species are important source of non-timber products since ancient times (resin, fodder for cattle or beekeeping) thus belong to culture heritage
7. Most species are spread in developing countries with unstable political situation, the populations are under pressure of local inhabitants and weak governments do not have sufficient resources and possibilities to protect these species

The main objective of the conference is to present latest results of research focused on species of dragon tree group and to determine main gaps for future investigation as the bases for conservation management. For this reason, the informal Dragon Trees Consortium will be established within conference.

1) Taxonomy, evolution**A. Miller**

Recent studies place the genus *Dracaena* in the family Asparagaceae subfamily Nolinoideae. DNA analysis showed that *Dracaena* clade includes ancestral genus *Pleomele* Salisbury, *Chrysodracon* (Jankalski) P.-L. Lu & Morden and *Sansevieria*. The dragon tree group of *Dracaena* doesn't create monophyletic clade on tree of all *Dracaena* members. DNA analysis shows that differences in arborescent *Dracaena* habit are homoplasious so arborescence could have arisen independently during evolution of *Dracaena* genus repeatedly. Thus, in taxonomy and evolution of *Dracaena* and relative genus are many open questions and aim of this session is to find answers.

2) Morphology and anatomy**J. Jura-Morawiec**

This session aims to provide an overview of the morphological and anatomical characteristics of dragon trees, such as e.g., shape/structure modifications caused by environmental factors, structure-function relationships at the organ/tissue level, or species-specific characters. Any research relevant to the topic is welcome, including current and potential methodological (sampling, sample preparation) and analytical approaches (image analysis, cell measurement) that might broaden our understanding of the biology of dragon trees at the morphological and anatomical level.

3) Eco-physiology**N. Nadezhdina**

Physiology of dragon trees was till now poorly studied. The lack of studies on monocot functionality is probably due to the lack of commercial importance of arborescent monocots and their remoteness from major academic institutions. Another reason of lack of such studies could be that vascular system of arborescent monocots is more complicated than in dicots. Sap flow, water uptake from mist and fog, photosynthesis and other physiological processes were poorly studied in both, laboratory and *in situ* conditions. Especially *in situ* investigation for long-term period is requested to understand the way, how *Dracaenas* survive in their harsh environment.

4) Distribution, ecology**F. Attorre**

Population inventory is missing especially for African and Arabian species. The knowledges about detailed distribution of individual species and their population structure are urgently needed because most of species are strongly threatened. There is no information published regarding the growth dynamic and age estimation of other dragon tree species except *D. draco* and *D. cinnabari*. Growth of *D. draco* is described based only on a few specimens, mostly biggest and oldest, young measured trees were cultivated out of the area of origin, information is sketchy. Only growth of *D. cinnabari* was investigated *in situ* on sufficient amount of trees, nevertheless information is incomplete. For example, we still don't know methods of age estimation and growth dynamics of the stem before first flowering. Poor information are known concerning the water uptake from horizontal precipitation

5) Ethnobotany, history of resin harvesting**M. Morris**

The first reference to the actual origins of dragon's blood, however, comes from the Periplus Maris Erythraei (mid-first century BC), which mentions that Arab, Indian and Greek settlers were sailing to Soqotra to trade in tortoise shell, aloes and Indian cinnabar. A Fourier Transform Raman Spectroscopic study of dragon's blood resins from a number of geographical locations found that the original source of this resin in antiquity was from the

Dracaena cinnabari of Soqatra. This would certainly seem to indicate that Soqatra was not only a primary source of dragon's blood in antiquity, but that it was being intensively harvested. Whilst the trade in dragon's blood resin continued throughout the medieval period there were an increasing number of alternatives from different geographical locations such as the Canary Islands and the East Indies. This demand continues into the seventeenth century, with ships of the East India Company reportedly having carried out a small trade in aloes and dragon's blood. The importance of this trade locally is reflected in a nineteenth century account, which mentions that the Sultan not only controlled much of the trade but also derived his third highest source of revenue from dragon's blood resin, after ghee and aloes. Whilst the trade in dragon's blood is likely to have formed an important part of Soqatra's economy for several centuries little is known about how it was managed or harvested. To determine this, it was necessary to combine the archaeological, historical and ecological evidence, which demonstrates that there was likely to have been an intensive island-wide harvesting and management strategy for of Dragon's Blood from at least the mid-first century AD. Similarly, *Dracaena cochinchinensis* and relative Asian species played important role in Chines region from ancient time.

6) Chemical composition of resin, medical use

Tao Yi

Dragon's blood is the red resin produced as secondary metabolites by the xylem. Dragon's blood derived from *Dracaena* species is a phenolic resin, with chemical content based on i) Flavonoids (Chalcones and Dihydrochalcones, Flavanones and Flavans, Polymeric Flavonoids, Chromogen Ketones), ii) Terpenes, Steroids and Steroidal Saponins, iii) Lignans, iv) Phenolic Constituents, v) Other Ingredients (alkanes, olefins, acids, esters, aromatic constituents). The main chemical constituent of this kind of dragon's blood are flavonoids. Many flavonoids, chalcones, chalconepolymers, stilbenes, sterol saponins have been isolated in dragon's blood. These compounds have been used for centuries in traditional medicine and possesses antimicrobial, antiviral, antitumor, antihemorrhagic, immunomodulatory, antiulcer, analgesic, antioxidative, antiinflammatory and antimutagenic activities. Chemical content of *D. cinnabari*, *D. draco* and *D.cochinchinensis* resin is well-recognized, however, there is a lack of studies focused on volatiles produced by resin of other dragon tree species.

7) Species-specific relationships (Dragon trees as habitat)

R. Vasconcelos

Dragon trees serve as the umbrella and flag species of communities that co-create in regions of their occurrence. Mostly endemic dragon tree species are habitats for also many others often endemic organisms: reptiles, insects, birds, mosses, lichens, etc. Dragon trees are also labelled as nurse trees providing the suitable environment for many plant species and keeping high level of biodiversity. The importance of dragon trees as habitat isn't well described in many regions of occurrence!

8) Threat, nature conservation

A. Forrest

Most arborescent species of *Dracaena* genus are endemic, thus endangered and listed in Red List in global or national levels. In the case of the dragon tree, the widespread lack of regeneration and the consequent decline in population densities have been well documented and clearly indicate the high threat of these iconic species. The main reasons for population decline are overgrazing and following ecosystem aridification, long-term climate oscillation,

cutting of leaves, dragon blood harvesting, mine extraction and road construction, these effects can be intensified by global climate change in the last years. The fragmentation and isolation of dragon tree populations could cause the bottlenecks effect. Effective conservation measures for dragon's blood tree are thus urgently needed, but designing them requires a better understanding of the species' ecology and population dynamics.

Conference Venue

The conference will be held from September 5th to 8th, 2019, Mendel University in Brno (Zemědělská 1, Brno, <http://www.mendelu.cz>), Czech Republic.

Call for Papers

Participants are kindly invited to submit abstracts of papers and posters related to the themes of the conference. Each submitted abstract will be subject to peer review and the conference organizers reserve the right to allocate the appropriate means of presentation to submitted contributions.

Preliminary Programme

Thursday 5 th September 2019	Registration, Welcome excursion
Friday 6 th September 2019	Conference opening (welcome and opening speeches) Introductory plenary session Plenary session Poster session
Saturday 7 th September 2019	Plenary session Conference conclusion Dragon Tree Consortium Gala conference evening
Sunday 8 th September 2019	Conference excursions, Individual departure

Timeframe

December 2018	1st Announcement
31st March 2019	Deadline for paper and poster abstracts submission, Deadline for the latest registrations
31 st April 2019	Notification of paper and poster acceptance 2nd Announcement (with the final conference programme)

Conference Proceedings

All accepted abstracts will be published in the official conference proceedings when at least one author is registered, and the conference fee is paid. Proceedings will be provided to the participants in printed form as well as online. Selected papers (accepted by the Editorial Board) will also be suggested for publication as the special issue (the journal will be specified).

Fees and registration

Registration via conference web sites: <https://fraxinus.mendelu.cz/tropicalforestry/dragon-tree-conference/>

Conference fees:

	Early registration Till 31 st March	Normal registration Till 31 st July	Late registration Till 5 th September
Normal	300 EUR	350 EUR	400 EUR
Accompany person	150 EUR	150 EUR	200 EUR
Student, retired	100 EUR	150 EUR	200 EUR

The conference fee includes:

- Conference organisational costs
- All lunches during the conference
- Coffee breaks
- Participation in all plenary sessions
- Conference materials and conference proceedings

Cost of conference gala dinner is 20 EUR.

Excursions:

Welcome excursion (5.9.2019) the program will be specified

Conference excursion (8.9.2019)

1/ will take place in the Lower Morava UNESCO World Heritage Site and Biosphere Reserve (<http://www.dolnimorava.org>). The biosphere reserve was established on the area of 300 square km in 2003. The biosphere reserve covers the landscape of limestone rocks of the Pavlovske vrchy /the Pavlov Hills/ with Panonian xerotherm biotopes, the landscape of the alluvial plain by the confluence of the Morava and the Dyje rivers with a unique complex of wetlands, alluvial meadows and floodplain forests, and the composed cultural landscape of the Lednice – Valtice Area (which is a part of the UNESCO World Heritage). The management of the biosphere reserve is provided by a common profitable company with the main aims of creation of suitable conditions for sustainable development of the area and support of the nature conservation and landscape protection. The field trip will be focused on visiting various types of landscape within the biosphere reserve and on the introduction of various activities leading to ensuring of the harmonious development. Part of this excursion will be the **dinner in the wine cellar with wine tasting**.

2/ on demand we could arrange alternative excursion to Prague.

Price of Conference excursion is **50 EUR**.

Payment:

All fees pay please via bank account (please make sure outcoming bank transfer fees are paid by your side)

Owner: Nadační fond prof. Aug. Bayera foundation

BIC: CEKOCZPP

IBAN: CZ90 0300 0000 0001 0262 0200



Steering committee

Petr Maděra

Department of Forest Botany, Dendrology and Geobiocoenology, Mendel University in Brno, Czech Republic

Petr is a professor of Forest Phytology at Faculty of Forestry and Wood Technology, Mendel University in Brno. His research is focused on forest biodiversity, forest and woody plants ecology from individual through population to the ecosystem level. Working more than 15 years on Soqatra Island, his research naturally focused on the local endemic dragon's blood tree (*Dracaena cinnabari*), its population decline, ecology and possibility of restoration. During the time, he gained experiences from Oman, Yemen (*D.serrulata*), Ethiopia (*D. ombet*) and Canary Islands (*D.draco*).



Anthony G Miller

Centre for Middle Eastern Plants, Royal Botanic Garden Edinburgh, Great Britain

Tony was employed as a SW Asian botanist and professor at The Royal Botanic Garden Edinburgh from 1974 to 2017. His research focussed on floristic, taxonomic and conservation studies in SW Asia. Field work activities included: assessing the status of vegetation and threatened species, surveying biodiversity hotspots; ethnographic studies and biodiversity impact and richness assessments for landscape potential and for restoration. During these surveys he has discovered and scientifically described many species new to science.



Alan Forrest

Centre for Middle Eastern Plants, Royal Botanic Garden Edinburgh, Great Britain

Alan is a researcher in Centre of Middle Eastern Plants under Royal Botanic Garden in Edinburgh. His work is driven by a desire to contribute to plant species and ecosystem conservation using a variety of tools and methods. He manages a diverse portfolio of programs focusing on research into the conservation and sustainable use of plants in Soqatra, Afghanistan and Tajikistan. A certified IUCN Red List assessor and trainer, focusing on Red Listing plants in Arabia and SW Asia and integrating conservation assessments into protected areas and management planning



Miranda J Morris

University of St. Andrews, Scotland, UK

Miranda is an independent researcher and Honorary Research Fellow of the University of St. Andrews. Her principal interests are the ethnography and non-Arabic languages of southern Arabia, in particular the group of six pre-literate languages called 'The Modern South Arabian Languages': Mehri, Ḥarsūsi, Baḥārī, Šherēt and Soqoṭri. She has worked on a variety of projects in the region: for the Darwin Initiative, UK; the Global Environment Facility; the European Union; and for the Royal Botanic Garden Edinburgh. Most recently (2013 -2017) she has been involved with the Leverhulme-funded Documentation and ethnolinguistic analysis of the Modern South Arabian languages. She is currently working with a Global Environment Facility project on Soqatra.



Fabio Attorre

Department of Environmental Biology, Sapienza University of Rome, Italy

Fifteen years of experience in environmental cooperation programs in several biodiversity hotspots of the world (Galapagos Archipelago – Ecuador, Socotra archipelago - Yemen, Protected areas of Albania, Great Limpopo Transfrontier Area - South Africa, Mozambique, Zimbabwe, Papua New Guinea) allowed him to develop a deep knowledge about different ecosystems and environmental issues. His main research field is the application of spatial models to assess the conservation status of species and habitats, to support the management of protected areas, and to evaluate the impact of climate change and alien species on ecosystems. He is also collaborating with national and international working groups aimed at assessing the conservation status of habitats and elaborating effective conservation strategies.

**Joanna Jura-Morawiec**

Polish Academy of Sciences Botanical Garden - Centre for Biological Diversity Conservation

Joanna is an Associate Professor at the Polish Academy of Sciences Botanical Garden - Centre for Biological Diversity Conservation in Powsin, and Head of the Plant Anatomy Laboratory. Her research interests include developmental, functional and comparative anatomy of woody plants. Currently, the focus of her research is the growth and structure of dragon trees (*Dracaena* spp.). Thanks to a grant awarded by the National Science Centre in Poland, she was able to organize several research trips to Gran Canaria to study morphology/anatomy of stem and roots of dracaenas belonging to the dragon tree group.

**Nadezhda Nadezhkina**

Department of Forest Botany, Dendrology and Geobiocoenology, Mendel University in Brno, Czech Republic

Nadezhda is a professor at the Mendel University in Brno. Her training is in Plant Physiology. She has almost 40 years' experience on tree water relation studies based on sap flow dynamics in trees starting from irrigation control of apple orchard in Ukraine. Last two decades her research interests are associated with studies of function of forest trees under different climatic and edaphic conditions.

**Raquel Vasconcelos**

Research Centre in Biodiversity and Genetic Resources, University of Porto, Portugal

Raquel is currently a researcher at CIBIO/InBIO, Portugal. Her research interests are centred on combining ecological modelling techniques with morphological and genetic data to support conservation using reptiles as models. Her doctoral thesis focused on the use of integrative approaches to review the systematics of reptiles on the Cabo Verde Islands and on the combination of species richness and genetic diversity to optimize the design of protected areas in that archipelago. The postdoctoral fellowship also focused on the conservation of genetic diversity in hotspot islands of biodiversity, this time using the reptiles of the Socotra Archipelago as models. At the same time, she has participated and produced various



activities of dissemination and communication of science to increase knowledge and demystify the image of the non-specialized public about reptiles.

Tao Yi

School of Chinese Medicine, Hong Kong Baptist University

Organizational committee

Hana Habrová, Lenka Ehrenbergerová, Klára Lengálová, Martin Rejžek

Accommodation

The possibilities of accommodation near of the conference place:

Hotel Bobbycentrum - www.hotelbobbycentrum.cz/en

Hotel Avanti - www.hotelavanti.cz/en/

Hotel Europa - www.hotel-europa-brno.cz/en/

Hotel Amphone - www.amphone.cz/en/

If you prefer cheaper accommodation in student dormitory, please contact us for reservation

Contacts

More information concerning the conference will be available on the conference website – <https://fraxinus.mendelu.cz/tropicalforestry/dragon-tree-conference/> and on the facebook.

If you need more information, please contact us through our website or this e-mail: dragontrees@mendelu.cz