

Academic CV – Hendrik KÜPPER

Personal details

Name: Prof. Dr. Hendrik **Küpper**

Nationality: Czechia, Germany

Affiliation: Czech Academy of Sciences, Biology Centre
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Academic career and positions

2014-* Head of the newly established department "Plant Biophysics and Biochemistry" at the Institute of Plant Molecular Biology at the Biology Centre of the Czech Academy of Sciences, České Budějovice (Czech Republic)

2011 - 2014 "Außerplanmäßiger Professor" at University of Konstanz

2010 - 2014 Award of a Heisenberg fellowship of the DFG (started August 2010)

2005 - Visiting Professor, South Bohemian University, České Budějovice, Czech Republic (became part-time employment since August 2014)

2004 - 2010 Professor as Juniorprofessor, University of Konstanz

2002 -2004 Postdoctoral work with Prof. Leon V. Kochian, (Cornell University, USA)

2001 - 2002 Postdoctoral work with Prof. Peter M.H. Kroneck (University of Konstanz)

2001-* Dr. rer. nat., University of Konstanz, grade "Summa cum laude", with majority of the practical part of the thesis carried out at the Department of Photosynthetic Microorganisms, Institute of Microbiology, Czech Academy of Sciences (Třeboň, Czech Republic) and IACR-Rothamsted, Harpenden (U.K.)

1999-* Diploma of Biology (≈ MSc) at University of Konstanz, grade 1.0 ("very good"), with practical part of thesis carried out at the Department of Photosynthetic Microorganisms, Institute of Microbiology, Czech Academy of Sciences (Třeboň, Czech Republic)

Research interests

General interests. The main focus is on the interaction of higher plants and algae with trace metals in terms of metal trafficking, sequestration, complexation and hyperaccumulation, metal toxicity, metal detoxification, metal deficiency and interaction of trace metal metabolism with biotic stress. This involves analysis of biophysics, biochemistry and ecophysiology of photosynthetic organisms (terrestrial and aquatic higher plants, algae, cyanobacteria) with physico-chemical and molecular methods. For this purpose, I also develop and advance techniques and instrumentation.

h-index: 35 according to Web of Science (Researcher ID: J-5152-2012), 42 according to Google Scholar. These articles have been cited 6,837 times according to WOS / Researcher ID and 9,477 times according to Google Scholar until 27 September 2023

Most important publications

- Andresen E, Flores-Sanchez IJ, Brückner D, Bokhari SNH, Falkenberg G, Küpper H. Sublethal and lethal Cd toxicity in soybean roots specifically affects the metabolome, Cd binding to proteins and cellular distribution of Cd. *Journal of Hazardous Materials*. 2023;442: 130062. <https://doi.org/10.1016/j.jhazmat.2022.130062>
- Morina F, Küpper H. Trace metals at the frontline of pathogen defence responses in non-hyperaccumulating plants. *Journal of Experimental Botany*. 2022;73: 6516-24. <https://doi.org/10.1093/jxb/erac316>
- Küpper H, Bokhari SNH, Jaime-Pérez N, Lyubenova L, Ashraf N, Andresen E. Ultratrace metal speciation analysis by coupling of sector-field ICP-MS to high-resolution size exclusion and reversed-phase liquid chromatography. *Analytical Chemistry*. 2019;91:10961-10969. <https://doi.org/10.1021/acs.analchem.9b00222>
- Küpper H, Benedikty Z, Morina F, Andresen E, Mishra A, Trtílek M. Analysis of OJIP chlorophyll fluorescence kinetics and QA re-oxidation kinetics by direct fast imaging. *Plant Physiology*. 2019; 179:369-381. <https://doi.org/10.1104/pp.18.00953>
- Andresen E, Peiter E, Küpper H. Trace metal metabolism in plants. *Journal of Experimental Botany*. 2018;69:909-954. <https://doi.org/10.1093/jxb/erx465>
- Andresen E, Kappel S, Stärk HJ, Riegger U, Borovec J, Mattusch J, Heinz A, Schmelzer CEH, Matoušková Š, Dickinson B, Küpper H. Cadmium toxicity investigated at the physiological and biophysical levels under environmentally relevant conditions using the aquatic model plant *Ceratophyllum demersum* L. *New Phytologist*. 2016;210:1244-1258. <https://doi.org/10.1111/nph.13840>
- Küpper H, Kochian LV. Transcriptional regulation of metal transport genes and mineral nutrition during acclimation to Cadmium and Zinc in the Cd/Zn hyperaccumulator, *Thlaspi caerulescens* (Ganges population). *New Phytologist*. 2010;185:114-129. <https://doi.org/10.1111/j.1469-8137.2009.03051.x>
- Küpper H, Aravind P, Leitenmaier B, Trtílek M, Šetlík I. Cadmium-induced inhibition of photosynthesis and long-term acclimation to Cd-stress in the Cd hyperaccumulator *Thlaspi caerulescens*. *New Phytologist*. 2007;175: 655-674. <https://doi.org/10.1111/j.1469-8137.2007.02139.x>
- Küpper H, Mijovilovich A, Meyer-Klaucke W, Kroneck PMH. Tissue- and age-dependent differences in the complexation of cadmium and zinc in the Cd/Zn hyperaccumulator *Thlaspi caerulescens* (Ganges ecotype) revealed by X-ray absorption spectroscopy. *Plant Physiology*. 2004;134: 748-757. <https://doi.org/10.1104/pp.103.032953#>
- Küpper H, Küpper F, Spiller M. Environmental relevance of heavy metal substituted chlorophylls using the example of submersed water plants. *Journal of Experimental Botany*. 1996; 47:259-266. <https://doi.org/10.1093/jxb/47.2.259>

Additional research achievements

Selected third party funded projects

March 2020 (granted) implementation 8 Oct 2020 - 7 Oct 2024: COST network grant CA19116 "Trace metal metabolism in plants" (PLANTMETALS). It was submitted with 60 proposers from 20 COST member countries. Currently, this COST Action has grown to 210 member scientists from 42 countries registered in e-COST. In this project, I acted as the main proposer and am now Chair, Grantholder Scientific Representative and Grant Awarding Coordinator (formerly STSM Coordinator). <https://www.plantmetals.eu>

2015- 2023: Grant from the Ministry of Education, Youth and Sports of the Czech Republic with co-financing from the European Union, OPVVV project "KOROLID - Kovy, Rostliny a Lide" (Czech for "Metals, Plants and People"). I was the principal investigator. €5.270.000.

2017 - 2019: Grant from the Czech Science Foundation, project "Relationship between naturally zinc containing bacteriochlorophyll (Zn-BChl) and ecological adaptation in Acidiphilium bacteria" I was the principal investigator. € 231.000

Awards

2002 Award "Umwelt und Wohnen" given for my PhD thesis by the foundation "Umwelt und Wohnen", donated by the Landesbausparkasse Stuttgart

1999 Award given by the Faculty of Biology (donated by the VEUK, alumnis of the University of Konstanz) for the best diploma thesis of the year

Professional and scholarly activities

Selected memberships: Chair of COST Action CA19116 PLANTMETALS, member of Society of Bioinorganic Chemistry (ICBIC), member of the Federation of the European Societies of Plant Biology

Membership in review panels: 2015 – 2017 Member of the Proposal Review Panel "Imaging" at the Synchrotron research facility "Deutsches Elektronen-Synchrotron" (DESY), Germany.

Handling editor: Journal of Experimental Botany (2015-2020)

Reviewing activities:

For funding organizations: Alexander von Humboldt Foundation (AvH), Österreichische Akademie der Wissenschaften (ÖAW), Czech Science Foundation (CSF / GACR), Deutsche Forschungsgemeinschaft (DFG), Natural Environment Research Council (NERC).

For journals: Analytical Chemistry, Aquatic Toxicology, Biochimica et Biophysica Acta, Journal of Experimental Botany, Metallomics, New Phytologist, Plant and Soil, Plant Cell & Environment, Plant Physiology, Scientific Reports.

Recent selected invited oral presentations and conference contributions

Küpper H, Mishra S, Andresen E, Jaim-Pérez N, Rocchetta I (2019) Mechanisms of sublethal metal(loid) toxicity in contrasting photosynthetic organisms. 19th International Conference on Biological Inorganic Chemistry (ICBIC-19), 11-16 August, Interlaken, Switzerland (invited lecture)

Küpper H, Mijovilovich A, Mishra A, Morina F (2019) Investigation of metal(loid) distribution and speciation in plants by μ XRF and μ XANES on frozen-hydrated and living samples. 25th International Congress on X-ray Optics and Microanalysis (ICXOM-25), 5 - 9 August, Lombard, IL, USA (invited keynote lecture)

Küpper H (2019) Mechanisms of sublethal metal(loid) toxicity in plants. 15th International Conference on the Biogeochemistry of Trace Elements (ICOBTE 2019), 5-9 May, Nanjing, China (session lecture as invited initiator and co-organiser of Symposium 5: "Trace element uptake and metabolism in plants")