

Book of Abstracts

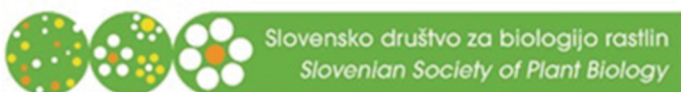
# PLANTMETALS

## TRACE METAL METABOLISM IN PLANTS



Annual Meeting 2024

Ljubljana, Slovenia,  
September 17<sup>th</sup> - 20<sup>th</sup>, 2024



**BF**

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Title page image (courtesy of Paula Pongrac):

Autofluorescence image of proso (*Panicum miliaceum* L.) leaf cross-section captured with Axioskop 2 MOT microscope equipped with an AxioCam MRc colour digital camera (Carl Zeiss AG, Göttingen, Germany) using UV excitation (365 nm). Length of the image is 275 µm.

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# Programme at a glance

## **Tuesday, 17<sup>th</sup> September 2024**

Registration, poster mounting, opening session

Oral session 1

Get-together dinner

## **Wednesday, 18<sup>th</sup> September 2024**

Oral sessions 2+3

MC-meeting

Conference dinner

## **Thursday, 19<sup>th</sup> September 2024**

Oral sessions 4+5+STSM Talks

Poster session

## **Friday, 20<sup>th</sup> September 2024**


Oral session 6

Session “The future of PLANTMETALS”


Excursion

# Programme

Tuesday, 17<sup>th</sup> September

15:00-16:30		Registration, poster mounting, welcome coffee	
16:30-16:45		Opening address by PLANTMETALS Action Chair and the LOC	
16:45-18:45	16:45-17:45	Session 1 (WG 1 1/2)	<b>Plenary lecture: Catherine Curie: A new role for the Mn transporter NRAMP2 in the seed including novel analytical and imaging tools to decipher metal homeostasis</b>
	17:45-18:00		Contributed talk 1: Seckin Eroglu: Iron accumulates in seed endosperm to trigger seed coat rupture
	18:00-18:15		Contributed talk 2: Sebastien Thomine: Regulation of intracellular free zinc concentration in <i>Arabidopsis thaliana</i>
	18:15-18:30		Contributed talk 3: Marie-Pierre Isaure: Various strategies developed by <i>Arabidopsis halleri</i> to cope with Cd toxicity
	18:30-18:45		Contributed talk 4: Sina Fischer: Itonomic phenotypes in neo-tetraploids
19:30-23:00		<p><b>Get-together dinner: Gostilna Čad (Cesta na Rožnik 18, 1000 Ljubljana), included in the registration payment.</b>  <b>Location: <a href="https://hotel-cad.si/en/restaurant/">https://hotel-cad.si/en/restaurant/</a>)</b></p> 	


## Wednesday, 18<sup>th</sup> September

08:45-10:00	08:45-09:15	Session 2 (WG 2)	<b>Invited lecture 1: Hendrik Küpper: Biochemical and physiological evidence for a beneficial role of chromium in plants</b>
	09:15-09:30		Contributed talk 5: Marie-Theres Hauser: Effects of nickel on pectinmethylesterase (PME)/ pectinmethylesterase inhibitor (PMEI) expression and activity in <i>Arabidopsis thaliana</i>
	09:30-09:45		Contributed talk 6: Fernando Antônio Gomes Brito: Cadmium (Cd) and zinc (Zn) isotope fractionation in a plant metallothionein (MT)
	09:45-10:00		Contributed talk 7: Jonathan Przybyla-Toscano: Adaptation of the membrane- and cell wall-associated proteome of <i>Arabidopsis thaliana</i> roots in response to uranium stress
10:00-10:30		Coffee break	
10:30-12:00	10:30-11:00	Session 3 (WG 4)	<b>Invited lecture 2: Matthias Wiggerhauser: Cadmium, zinc, and copper leaching rates determined in large monolith lysimeters</b>
	11:00-11:30		<b>Invited lecture 3: Hester Blommaert: The pathways of cadmium in cacao: in light of a synchrotron source</b>
	11:30-11:45		Contributed talk 8: Michel Mench: Phytomanagement of metal(loid)-contaminated soils with biomass sorghum: successes and failures
	11:45-12:00		Contributed talk 9: Gianluigi Giannelli: The multi-stress resistant PVr_9 bacterial strain mitigates Na <sup>+</sup> ions toxicity in <i>Arabidopsis</i> and tomato and improves tomato fruit nutritional characteristics
	12:00-12:15		Contributed talk 10: Aida Bani: Agromining as an agricultural alternative in the serpentine soils of the Albania
	12:15-12:30		Contributed talk 11: Valerie Bert: Characterization of <i>Arabidopsis halleri</i> and <i>Urtica dioica</i> responses to Zn and Cd: Soil management practices to help biofortification?
12:30-14:00		Lunch break	
14:00-17:30		Management committee meeting & Coffee break	
19:00-23:00		<p><b>Conference dinner: Allegria (Nazorjeva ulica 8, 1000 Ljubljana) self-paid, 40 € without beverages, to be paid on-site at the registration desk.</b></p> 	

## Thursday, 19<sup>th</sup> September

08:30-10:00	08:30-09:00	Session 4 (WG 3 1/2)	<b>Invited lecture 4: Tomica Mišljenović: Revealing Tl hyperaccumulation in the flora of the abandoned Allchar mine: New findings and future perspectives</b>
	09:00-09:15		Contributed talk 12: Stéphane Ravel: Cellular and molecular responses of the metal-tolerant green microalga <i>Coelastrrella</i> to uranium
	09:15-09:30		Contributed talk 13: Paco Romero: Physiological, biochemical and molecular approaches to understand the copper deficiency response in tomato
	09:30-09:45		Contributed talk 14: Petra Maskova: Horseradish, a panacea for arsenic contamination in temperate zone?
	09:45-10:00		Contributed talk 15: Emre Aksoy: Development of soybean lines with high iron and low phytate content via gene editing
10:00-10:30		Coffee break	
10:30-12:00	10:30-11:00	STSM talks	<b>Overview of the Short-term Scientific Missions (STSMs)</b>
	11:00-11:10		Contributed talk STSM1: Valentina Bočaj: Species-specific and metal-induced changes in gene expression and metabolome of closely related <i>Noccaea</i> species under field conditions
	11:10-11:20		Contributed talk STSM2: Magdalena Pypka: How do plants find Zn source?
	11:20-11:30		Contributed talk STSM3: Noelia Jaime Pérez: Cadmium and zinc uptake in <i>Sedum alfredii</i> : Role of apoplastic and symplastic pathways
	11:30-11:40		Contributed talk STSM4: Kumbirai Deon Mandebere: Iron accumulates in seed endosperm to aid germination
	11:40-11:50		Contributed talk STSM5: Anna Kokavcová: The potential of <i>Pistia stratiotes</i> for phytoremediation of metal-polluted environment
	11:50-12:00		Contributed talk STSM6: Muhammad Faizan Ilyas: Stability of chelated micronutrients (metals) in acidic and alkaline soils in relation to micronutrient availability to plants
12:00-13:30		Lunch break	
13:30-15:05	13:30-14:00	Session 5 (WG 3 2/2)	<b>Invited lecture 5: Marjana Regvar: Resolving structure-related trace element and molecular composition of Tartary buckwheat grain</b>
	14:15-14:30		Contributed talk 16: Josip Jurkovic: Norway spruce ( <i>Picea abies</i> ) needles as indicator for heavy metals pollution of Sarajevo
	14:30-14:45		Contributed talk 17: Pietro Peroni: Effect of root biostimulants on root growth and metal(loid)s uptake in <i>Miscanthus x giganteus</i>
	14:45-15:00		Contributed talk 18: Hagai Yasour: Involvement of trace metal nutrition in plant physiology process and abiotic stress responses
15:00-18:00		Poster session & Coffee break	

## Friday, 20<sup>th</sup> September

08:30-10:00	08:30-09:00	Session 6 (WG 1 2/2)	<b>Invited lecture 6: Oskar Siemianowski: How do plants manage their microelements? Untangling the Zn transport mechanisms between lateral roots</b>
	09:00-09:15		Contributed talk 19: Jessica Shadbolt: Good copper, bad copper: Characterising the physiological implications of contrasting alleles of HvHMA5
	09:15-09:30		Contributed talk 20: Filis Morina: Micronutrients at the frontline of plant defence responses
	09:30-09:45		Contributed talk 21: Filip Pošćič: Iron-mediated mitigation of hexavalent chromium toxicity in <i>Brassica juncea</i> and <i>Raphanus sativus</i>
	09:45-10:00		Contributed talk 22: Katarina Vogel-Mikuš: Mercury ligand environment in the food chain as affected by Se biofortification of plants
10:00-10:30		<b>Coffee break</b>	
10:30-12:30	10:30-11:30		<b>Planning the future of the PLANTMETALS as a society</b>
	11:30-12:00		Poster removal, wrap-up
12:00-13:15		<b>Lunch break</b>	
13:30-20:00	<p><b>Botanical Excursion: Visit the Idrija valley and Hg mine</b>  <a href="https://www.geopark-idrija.si/en/natural-heritage/plants/">https://www.geopark-idrija.si/en/natural-heritage/plants/</a></p> <p>The important European and international scientists who came to Idrija because of the mine did not only explore its geology, but also its botany. They laid the foundations of natural science in Slovenia. Knowledge of flora has a long tradition in the Idrija environment, which began with the arrival of the first botanist in Slovenia in the 16th century, <b>P. A. Mattioli</b>. He was followed by doctor and naturalist <b>G. A. Scopoli</b>, who discovered and described several previously unknown species, including the <b>henbane bell</b>, <i>Scopolia carniolica</i>, named after him. <b>B. Hacquet</b> worked in Idrija as the mine doctor. Two plants are named after him: <b>Hacquetia epipactis</b> and <b>Pedicularis hacquetii</b>. <b>F. Hladnik</b>, born in Idrija, is known as the founder of the Ljubljana Botanical Garden. Dedicating his life to researching the flora of the Carniolan region, he discovered a plant on the Trnovo Forest area that was later named <b>Hladnikia pastinacifolia</b>. In his memory, the left side of the Rake walking path was named Hladnik Botanical Ledge as many famous plants flower here in the spring. <b>H. Freyer</b> was born to a famous Idrija-based pharmacist Karl Freyer. He spent a lot of his time to studying botany in the Idrija region and was the first to describe <b>Daphne blagayana</b>, a flower even Frederick Augustus II of Saxony came to see.</p> <p>Famous in Idrija and its vicinity is also <b>Primula x venusta</b> that is a hybrid between <i>Primula auricula</i> and <i>Primula carniolica</i>. In the Upper Idrija area, there grow several species of <b>orchids</b> (Orchidaceae). Also special are Alpine plants such as the <b>alpine snowbell</b>, the <b>flower of the sweet-lady</b>, <b>Rhodothamnus chamaecistus</b>, and the <b>Bertoloni columbine</b>.</p> <p>As a homage to the pioneering researchers of nature, <b>Scopoli's Memorial Garden</b> is planted in Idrija – at the entry point to the Rake Walking Path.</p>		
			

**Location:**

**Department of Biology, Biotechnical Faculty, University of Ljubljana  
Večna pot 111, 1000 Ljubljana, Slovenia**





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## The importance of trace elements follow-up in *Cannabis sativa* L. varieties

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The importance of trace elements analysis in cannabis flowers should be emphasized due to several reasons, encompassing health, quality and regulatory aspects. Although *Cannabis sativa* L. varieties have become largely included in medicinal, cosmetic or food industry they should be employed with caution not only because of the cannabinoids, (THC which is considered for psychoactive compound), but also for their quality and toxicological aspects. *Cannabis* plants can absorb trace elements such as lead, mercury, cadmium, and arsenic from the soil, water, or fertilizers. These elements can be harmful or even toxic and should be taken as a serious threat to consumers.

Some authors confirmed that a trace elements accumulation in *Cannabis inflorescence*, was mainly affected by the geographical origin but the botanical variety can also influence the potential for absorption of these elements in *Cannabis*. In this way we have investigated and compared the content of trace elements in six different varieties, grown in a green house in the same indoor conditions. The results have demonstrated that content of mercury and cadmium were highest in Jack Kush variety, and lead and arsenic concentration was most increased in Glueberry OG variety. Regular analysis ensures the maintaining of consistent quality across different varieties and/or batches of cannabis products. Therefore, identifying and mitigating contamination sources, such as soil, water, or agricultural inputs, from one side, and strict follow-up of trace elements content through in door production quality control will ensures the purity of the final cannabis products.