

II. Natural Hazards and Climate Change Conference



Poster Session I

Agroclimatic Trends and Adaptation: Challenges and Future Perspectives in Hungary –
Erik Kovács, Balázs Zay, János Puskás

Biodiversity of cultivable bacteria in the rhizosphere of industrial crop plants in Hungary –
Orsolya Kedves, Tamás Zsolt Polyák, Katalin Perei, Csaba Vágvölgyi, László Kredics

Comparison of salt stress induced biochemical responses of *Lepidium sativum* (garden cress) and the salt tolerant *Lepidium crassifolium* –
Batnasan Ganbold, Adedokun Oluwatosin Peace, Rebeka Karginov, Ágnes Szepesi

Development of a healthy casing alternative from spent mushroom compost –
Henrietta Allaga, Dóra Horkics, Ádám Bordé, András Varga, Rita Büchner, Terézia Kovács, András Mész, Csaba Csutorás, Judit Bajzát, Nóra Bakos-Barczi, Csaba Vágvölgyi, László Kredics

Effect of plasma-activated water seed priming on the development of *Arabidopsis thaliana* seedlings in a drought stress model system –
Tamás Bodor, Gábor Fejes, Kinga Kutasi, Zsuzsanna Kolbert

Future crop yield trends across Europe from past observations and ISIMIP climate scenarios –
Tobias Conrad

Isolation, identification and characterisation of potential biocontrol agents of walnut pathogens in Turkey and Hungary –
Ahmet Akköprü, Younes Rezaee Danesh, Orsolya Kedves, Semra Demir, Emre Demirel Durak, Adnan Yaviç, Solmaz Najafi, Gokhan Boyno, Ceylan Pinar Uçar, Betül Yıldız Fırat, Árpád Brányi, Nóra Tünde Lange-Enyedi, Simang Champramary, Boris Indic, György Sipos, Csaba Vágvölgyi, László Kredics

Osmotic stress-induced anatomical changes in pea (*Pisum sativum* L.) leaves –
Réka Szöllősi, Gábor Fejes, Tamás Bodor, Zsuzsanna Kolbert

- Enhancing hydrocarbon biodegradation: Repeated application of extracellular organic matter from *Micrococcus luteus* in used lubricant oil-contaminated soils – *Klaudia Hoffmann, Enikő Mészáros, Gábor Feigl, Krisztián Laczi, Katalin Perei, Attila Bodor*
- A Research Station Plan for the Global Challenges of the 21st Century – *László Horváth, Zoltán Bozóki, Edit Mikó*
- Plasma activated water-based seed pre-treatment affects the development, in planta reactive oxygen- and nitrogen species and photosynthetic activity of osmotic-stressed pea plants – *Gábor Fejes, Tamás Bodor, Réka Szöllősi, Kinga Kutasi, Zsuzsanna Kolbert*
- Cellulose content in annual increments of Norway spruce (*Picea abies* (L.) Karst.) along an elevation gradient in the Rarău Mts (Romania) – *Daniela Maria Llanos-Campana, Zoltan Kern, Ionel Popa, Aurel Perşoiu*
- Frost rings in Swiss Stone Pine (*Pinus cembra*) from Rodna Mts. (Romania) - Anatomical evidence of late spring frost in the past centuries – *Eszter Mocsári, Balazs Nagy, Ionel Popa, Matyas Arvai, Zoltan Kern*
- The impact of polyethylene-based plastics and heavy metals on rapeseed root growth – *Kamilla Kovács, Enikő Mészáros, Dorottya Hicz, Gábor Feigl*
- The role of chitosan-encapsulated NO-donors in enhancing tomato resistance to fungal infections - *Dóra Kondak, Selahattin Kondak, Tamás Bodor, András Kukri, Réka Szöllősi, Zsuzsanna Kolbert*
- In silico assessment of the ecotoxicological characteristics of terbuthylazine as a pollutant in surface waters – *Tatjana Mitrović, Darija Obradović, Saša Lazović, Marija Perović*
- Zinc Oxide Nanoparticles: Dual Effects on Broccoli Growth Under Nutrient and Salinity Stress – *Adedokun Oluwatosin Peace, Batnasan Ganbold, Rebeka Karginov, Andrea Rónavári, Ágnes Szepesi, Zoltán Kónya*
- The role of climate microrefugia in shaping intraspecific trait variability in *Myrmica ruginodis* – *Bonita Ratkai, Kata Anna Bán, Kata Frei, Gergely Horváth, Gábor Li, Ádám Lőrincz, Gábor Lőrinczi, Fanni Pécsy, Zoltán Bátor, István Elek Maák*
- Temperature and geographical location induced fluctuations of population density of European ground squirrels in Hungary – *Csongor Gedeon, Olivér Váczi, Felix Knauer, Mátyás Árvai, Franz Suchentrunk*
- The accelerated spruce dieback in Central Europe is a warning sign of the climate change – *Zsuzsa Lisztes-Szabó, Mihály Braun, Albert Tóth, Elemér László, József Lennert, Anna F. Filep*
- Extreme Dry Events in Vojvodina: Observations and Climate Change Projections - *Atila Bezdán, Jovana Bezdán*
- Observed long-term trend in various extreme precipitation-related climate indices – *Csilla Simon, Mónika Lakatos, Olivér Szentes*
- Eutrophication in Freshwater Ecosystems: Impacts of Nutrients, Groundwater, and Climate Change – *Marija Perović, Vesna Obradović, Mitrinović David, Mitrović Tatjana*

Eutrophication in Freshwater Ecosystems: Impacts of Nutrients, Groundwater, and Climate Change

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The eutrophication presents the natural response of freshwater ecosystems to increased nutrient inputs. It is noticed that uncontrolled algal growth is intensified by global warming, leading to deterioration of water quality. The sources of high nitrate and phosphate concentrations are usually caused by improper fertilization techniques, inadequate manure storage, and untreated wastewater impact. Due to increased content of organic matter in water bodies, its subsequent decomposition leads to oxygen depletion, pH decrease, and creates hypoxic or anoxic conditions, resulting in fish mortality and ecosystem destabilization. The phenomenon of blooming reduces light penetration, increases turbidity, and leads to layering of the water body, making it unsuitable for drinking or irrigation. In the case of harmful algal toxins appearance, the risks to aquatic life, livestock, and human health are significant. Although it is often acknowledged that surface nutrient loads are the primary causes of eutrophication, groundwater influx during surface water recharge should also be considered. The content of nitrogen and phosphorus can be further increased if the surface water recharges with nutrient-enriched groundwater, maintaining eutrophic conditions even during times when surface inputs are reduced. This kind of nutrient-loaded recharge can prolong algal blooms, disrupt natural self-purification processes, and decrease the effectiveness of lake management techniques like sediment management, biological restoration, nutrient load reduction, and algal bloom control. Sediment temperature has a significant impact on nutrient cycling. The temperature increase induces microbial activity, thus organic matter content and consequently releases phosphate (PO_4^{3-}) and ammonia (NH_4^+) from sediments. Because of longer stratification periods and higher microbial activity, summertime usually sees the most obvious nutrient release from sediments. The seasonal peaks are prolonged, and nutrient retention is increased by rising global temperatures. The intensification of eutrophication brought on by climate change reflects precipitation patterns, with heavy rains increasing nutrient-rich discharge and droughts lowering water exchange. Disturbed patterns of oxygen saturation, water layering and stratification impact biodiversity, and usability of water, emphasizing the need for climate-adaptive strategies to protect freshwater resources.