



BOOK of **ABSTRACTS**

4th INTERNATIONAL CONFERENCE ON PLANT BIOLOGY (23rd SPPS Meeting)



**6-8 OCTOBER 2022
BELGRADE**

Serbian Plant Physiology Society

**Institute for Biological Research “Siniša Stanković”
National Institute of Republic of Serbia, University of Belgrade**

Faculty of Biology, University of Belgrade

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SECTION 2

Plant Stress Physiology

The usage of silicon fertilisation in order to mitigate the oxidative stress and to improve the resilience of barley subjected to drought

PP2-22

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Drought causes huge agricultural and economic losses worldwide. Silicon (Si) is considered a beneficial element for plants. It mitigates stress caused by salinity, drought, and high and low temperatures by promoting antioxidant production. However, the underlying mechanisms are still not elucidated. We investigated Si fertilisation effect on photosynthetic parameters, trichome number, leaf optical properties, as well as profiles of amino acids and polyphenols in barley exposed to water shortage. Silicon was applied in three growth stages: (i) before the flag leaf emergence; (ii) prior to the grain filling phase; (iii) at the grain filling phase start. Drought negatively impacts photochemical efficiency, stomatal conductance, photosynthetic pigment content, and leaf reflective and transmissive properties. Si application between flag leaf emergence and grain filling had the strongest effect on light reflectance. Among all analyzed phenolics, saponarin was the most abundant in all samples, irrespective of water regime and Si supply. Caffeoyl ester was the only hydroxycinnamic acid showing significant accumulation with the latest applied Si compared to no added Si upon drought. The major amino acids in barley leaves were glutamate, glutamine, aspartate, asparagine, and serine. Aspartate content was the highest in leaves exposed to drought without Si addition, while lysine was the most accumulated in the leaves supplemented by Si at the grain filling phase start. Proline was 2.5 times more abundant in the leaves exposed to drought regardless of Si treatment. Taken together, although Si did not mitigate drought stress effects, its effect was dependent on the barley growth phase prior to supplementation.

Keywords: amino acids, proline, polyphenols, optic leaf properties, photosynthesis

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