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POSTER PRESENTATIONS

Anatomical and physiological changes in *Iris pumila* leaves in unpolluted and polluted environment

PP6-1

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Plants are capable of sensing various types of stress and plant stomata, as well as photosynthetic pigments may play an important role in response to altered environmental conditions in order to maintain optimal photosynthetic efficiency, carbon uptake and water metabolism. In this survey, we estimated the stomatal density and photosynthetic pigments concentration of *Iris pumila* leaves as an indicator of antropogenically induced stress (traffic pollution). Leaf samples were taken from one unpolluted site – Deliblato sands (natural protected area), and one polluted site (along the main road Belgrade-Novı Sad), where replicas of the clones selected in the unpolluted site were previously transplanted. We measured anatomical (Stomatal density) and physiological traits (Chlorophyll a (Chla), Chlorophyll b (Chlb), Carotenoid (C) and Total chlorophyll (ChT) concentration, the ratio of Chlorophyll a to Chlorophyll b, and the ratio of Chlorophyll a to Carotenoids). Estimated parameters differed significantly between studied sites. We detected statistically significant increase in stomatal density in polluted sites. Chla, Chlb and C concentrations, as well as ChT and Chla/C showed significantly lower values in a polluted environment. Cha/b ratio showed significantly higher values in plants originating from the polluted habitat. We can conclude that there was a decrease in photosynthetic pigments in polluted habitat, as well as change of Chla/C ratio in favor of carotenoids that serve as photo protective pigments. All these conclusions confirm that stomatal density and concentration of relevant pigments can serve as a stress indicator in this protected species.

Keywords: anthropogenic pollution, stomatal density, photosynthetic pigments, *Iris pumila*

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Morphological integration of vegetative traits in *Lamium purpureum* originating from two contrasting light habitats (Open and Shade), in two natural populations and grown in two densities (High and Low)

PP6-2

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Plants as sessile organisms have to continuously adjust their growth, development and reproduction to variable surroundings, especially in relation to light as an essential abiotic factor. Plants growing in crowded conditions inevitably compete for light, namely, for an ability to photosynthesize. In this study, we addressed correlation structures between traits essential for the response to changes in light quality and light intensi-

ty, in *Lamium purpureum* plants originating from two habitats (Open and Shade), in two natural populations (Vršac mountain and Zuce) and grown in two densities (High and Low). Every single plant was planted in a single pot and this arrangement allowed competition only for light and not for the other resources. We measured eight traits after 8 weeks of growth: height, first and second leaf length, first and second leaf width and number of leaves, number of internodes and number of shoots per plant. We aimed to test if there are statistically significant phenotypic correlations between traits (morphological integration) and if they depend on the population, habitat and density treatment. Correlation structures differed between habitats and treatments in both populations. Plants in Vrsac/Shade habitat and Zuce/Open habitat, showed the lowest level of between trait integration in the High light treatment. Between-population differences in correlation structures were more numerous in the High light treatment for both habitats.

Keywords: morphological integration, conspecific density, *Lamium purpureum*

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Spatial and temporal environmental differences for pendunculate oak (*Quercus robur* L) pollen traits

PP6-3

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The physiological characteristics of pollen, germination percentage and germination energy, depend on the plant species, the genetic variability and also on environmental conditions. In this study we analyzed the differences of oak pollen germination percentage and germination energy between locality and years of collecting pollen, in optimal nutrient medium of 15% sucrose. The pollen samples were collected in 2011, from four locations (Košutnjak, Novi Beograd, Ada Ciganlija and Bojčinska šuma). The results of analysis of variance confirmed intra-individual difference within locality ($p < 0.0001$) for the length of the pollen tube. The germination percentage (54.0-60.1%) and energy (132.7-160.9 μm) were not significantly different between localities ($p > 0.05$). The spatial variability, of the percentage of germination and germination energy, has been monitored for six years, on one tree at the Banovo brdo location. The results of one way analysis of variance, confirmed a statistically significant difference between the years ($p < 0.0001$) for both traits. The lowest percentage of germination was recorded in 2005, 28.2% and maximum 89.7% in 2011. The pollen taken in 2004 had minimum germination energy of 81.8 μm , while the maximum value of 196.1 μm was recorded in 2006. The relationship of temperature and precipitation in the period immediately prior to flowering significantly affected the physiological properties of pollen. The smaller percentage of germination in 2005 was affected by lower temperatures and higher precipitation compared to 2011 as a dry year. Spatial and temporal environmental differences had statistically significant impact on the variability of physiological traits of pollen.

Keywords: pollen germination percentage, pollen germination energy, *Quercus robur* L.

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