Serbian Plant Physiology Society

Institute for Biological Research „Siniša Stanković", University of Belgrade

1st International Conference on Plant Biology

20th Symposium of the Serbian Plant Physiology Society

Hotel PATRIA, Subotica, June 4-7, 2013

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though a redox non-active metal, zinc accumulation provokes changes in the chemical composition of the cell wall, such as increase in phenolics and other antioxidants as well as formation of quinhydrone (charge transfer complex of quinone and hydroquinone), hydrogen peroxide, hydroxil (·OH) and carbon-centred radicals (·CH3). Zinc, quinhydrone and other prooxidants may impose oxidative stress in plants, however, they could be detrimental to fungal pathogens and herbivorous insects. To assess if zinc and quinhydrone (QH) may contribute to the resistance of *V.thapsus* to a *Cionus* herbivorous insect we performed vacuum infiltration of leaf discs taken from plants grown in nonpolluted area, with either ZnSO4 or QH solutions at two different concentrations. In a two-choice test insects were offered two leaf disks: Zn(or QH)-treated and control. The results showed that *Cionus* beetles were strongly deterred by treated disks, i.e., the consumption of treated disk was much lower in comparison to the control. Decreased consumption was also revealed in no-choice experiment where beetles were offered two identical disks. Beside feeding deterrence our experiment proved toxicity of both zinc and QH which reduced survival of the beetles. Apparently, zinc toxicity is sufficient to protect the plant from *Cionus* attack, while formation of QH may provoke additional adverse effects. Our results are in agreement with elemental defence hypothesis which predicts that (hyper)accumulators have advantage over non(hyper)accumulator plants in the ability to cope with biotic stress.
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Allelopathic potential of *Nepeta rtanjensis* Diklić & Milojević and *Nepeta cataria* L. essential oils on selected crop species

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Allelopathy, the chemical mechanism of plant interference, was detected in many plants from fam. *Lamiaceae*, including *Nepeta* species. The majority of *Nepeta* species are characterized by the presence of nepetalactone as the dominant component in essential oils. This monoterpenoid lactone exists in the form of one or more stereoisomers, and corresponding enantiomers.
The present study investigates the allelopathic potential of *Nepeta rtanjensis* Diklić & Milojević and *Nepeta cataria* L. essential oils which differ in their qualitative nepetalactone content, on the seed germination of four selected crop species (*Lepidium sativum* L., *Lactuca sativa* L. cv. Majska Kraljica, *Lotus corniculatus* L., cv. Bokor and *Brassica napus* L. cv. *napus*). GC-MS analysis revealed that *trans,cis*- stereoisomer of nepetalactone is dominant in essential oil of *N. rtanjensis* (72,03%). Essential oil of *N. cataria* used in the present study is characterized by the high contetnt of *cis,trans*-nepetalactone (90%). Both essential oils exhibited significant allelopathic potential against all model species, with *N. rtanjensis* essential oil beeing more efficient. These results suggest that nepetalactone stereochemistry significantly determines its allelopathic potential, and that the effect of both nepetalactone stereoisomers is dose-dependent. Essential oils reduced seed germination by influencing germination dynamics, or by irreversibly inhibiting the germination of seeds. Among tested crops, *L. sativa* was shown to be the most sensitive to allelopathic potential of *N. rtanjensis* and *N. cataria* essential oils, while *B. napus* was the most tolerant.
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