Growth, photosynthesis and proline accumulation of metal-accumulator weeds

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The experiment aimed to examine the growth and some physiological parameters of five metal-accumulator weed species in response to mercury (Hg) and lead (Pb) treatment. Five weed species (Branchiaria mutica, Cyperus kyllingia, Ipomea aquatica, Mikania micrantha, and Paspalum conjugatum) were grown in water culture using half strength Hoaglandâ€™s solution and subjected to Hg(NO3)2 and PB(NO3)2 at 0, Â 0.25 and 0.5 mM for 3 weeks. The growth, photosynthesis, lipid peroxidation and proline content were observed during the treatments. The result showed that both Hg and Pb decreased growth significantly, but the decrease was far higher in Hg than in Pb treatments. Hg treatment reduced photosynthetic rate dramatically under different photosynthetic photon flux density suggesting that heavy metal Hg until 0.5 mM caused the damage of photosynthetic apparatus almost all species except in I. aquatica. Hg and Pb treatment caused dramatic increase in leaf MDA content, which was associated with the decrease of chlorophyll content significantly. Almost all the species were tolerant to Pb treatment up to 0.5 mM except M. micrantha, while only C. kyllingia and I. aquatica were tolerant to Hg treatment up to 0.5 mM. Only Hg treatment and not Pb that induced higher proline content in the leaves of threated plants without clear pattern of the increment among the species suggesting that proline may have a role as alarm stress rather than tolerant indicator.