



Contribution ID : 14

Type : Poster

## Intra-specific variation in growth and photosynthetic responses of duckweed *Lemna gibba* to manganese

*martedì 29 settembre 2026 17:55 (20)*

**Abstract** This study investigated the growth and physiological responses of four *Lemna gibba* clones (UD0101, UD0103, UD0106, and UD0114) following 7-day exposure to Mn ( $0.05\text{--}160\text{ mg L}^{-1}$ ) under controlled conditions (Steinberg's medium containing  $0.05\text{ mg Mn L}^{-1}$ ). Growth was assessed using frond area relative growth rate (RGRFA) and frond number relative growth rate (RGRFN). Photosynthetic performance was evaluated using Fv/Fm, Y(II), Y(NPQ), and Y(NO). All clones were affected at Mn concentrations  $\geq 20\text{ mg L}^{-1}$ , whereas UD0103 showed growth inhibition from  $5\text{ mg L}^{-1}$ . Under control conditions, RGRFA ranged from  $0.287\text{ day}^{-1}$  (UD0106) to  $0.334\text{ day}^{-1}$  (UD0101), while RGRFN ranged from  $0.269\text{ day}^{-1}$  (UD0106) to  $0.294\text{ day}^{-1}$  (UD0101); UD0103 and UD0114 showed intermediate growth rates. At  $160\text{ mg Mn L}^{-1}$ , RGRFA relative to the control indicated Mn tolerance in the order UD0101 (50%) > UD0114 (40%) > UD0103 (27%) > UD0106 (25%). Despite growth inhibition, Fv/Fm remained at or slightly above control levels (99–108%) in UD0101 and UD0106, whereas UD0103 and UD0114 showed reduced Fv/Fm at  $\geq 20\text{ mg Mn L}^{-1}$ , reaching minima of 94.9% and 95.2% of the control, respectively. Similarly, increasing Mn concentrations reduced Y(II) in all clones. At  $40\text{ mg L}^{-1}$ , Y(NPQ) increased significantly, peaking at approximately 1.8-fold and 1.7-fold above the control in UD0106 and UD0114, respectively. In contrast, UD0101 maintained stable Y(II), Y(NPQ), and Y(NO), whereas UD0103 showed the greatest increase in Y(NO) and a reduced Y(II). These findings suggest that UD0103 could serve as a bioindicator of Mn pollution, whereas UD0101 shows potential for phytoremediation.

### Corresponding author email

amarefassil@gmail.com

### Scientific Session

Cell Biology, Physiology, Metabolisms

### Keywords

Duckweeds, clone, Chlorophyll fluorescence, Manganese

### References

Irfan M, Mészáros I, Szabó S, Oláh V. Comparative Phytotoxicity of Metallic Elements on Duckweed *Lemna gibba* L. Using Growth- and Chlorophyll Fluorescence Induction-Based Endpoints. *Plants* 2024;13. <https://doi.org/10.3390/plants13020215>.

**Primary author(s):** Mr. ABEBAW, Amare Fassil (Doctoral School of Natural Sciences, Szent István Campus, Hungarian University of Agriculture and Life Sciences)

**Co-author(s) :** AMRI, Raja (Doctoral School of Natural Sciences, Szent István Campus, Hungarian University of Agriculture and Life Sciences); Prof. OLÁH , Viktor (Department of Botany, Faculty of Science and Technology, University of Debrecen); Prof. MÉSZÁROS, Ilona (Department of Botany, Faculty of Science and Technology, University of Debrecen)

**Presenter(s) :** Mr. ABEBAW, Amare Fasil (Doctoral School of Natural Sciences, Szent István Campus, Hungarian University of Agriculture and Life Sciences)

**Session Classification :** Poster Session I