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Evaluation of the root system and phyto-management potential of *Sesbania cannabina* grown in hexavalent chromium contaminated soils utilizing modified rhizobox systems.



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This study aimed to assess how the root system of *Sesbania cannabina* behaves under various concentrations of Cr (VI) and whether it could be a suitable species for the phyto-management of Cr (VI) contaminated soils. The experiment was conducted in rhizoboxes under greenhouse conditions using a sandy loam soil dosed with potassium dichromate giving eight different Cr (VI) concentrations (0 ppm, 5 ppm, 10 ppm, 20 ppm, 40 ppm, 80 ppm, 160 ppm, and 360 ppm). Plant roots were photographed with a Canon 60D (18-megapixel) camera with a 50 mm prime lens and analysed with Image J image processing software.

At 360 ppm concentration, seeds of *S. cannabina* germinated but were unable to grow further. However, under concentrations of 0-80ppm there was no significant change observed in the root growth (Length) . At 160 ppm root growth was reduced by about 55±0.65% at 25 days and 35±0.25 % at 60 days compared to plants grown at 0 ppm. After 60 days no chromium (VI) was detected in the soil for (0 to 160 ppm) in comparison with the control (with no plants) where no changes in Cr (VI) were observed.

The absence of Cr (VI) in soil after 60 days suggests that *S. cannabina* can be considered as a candidate for phyto-management of soils containing up to 160 ppm Cr (VI).

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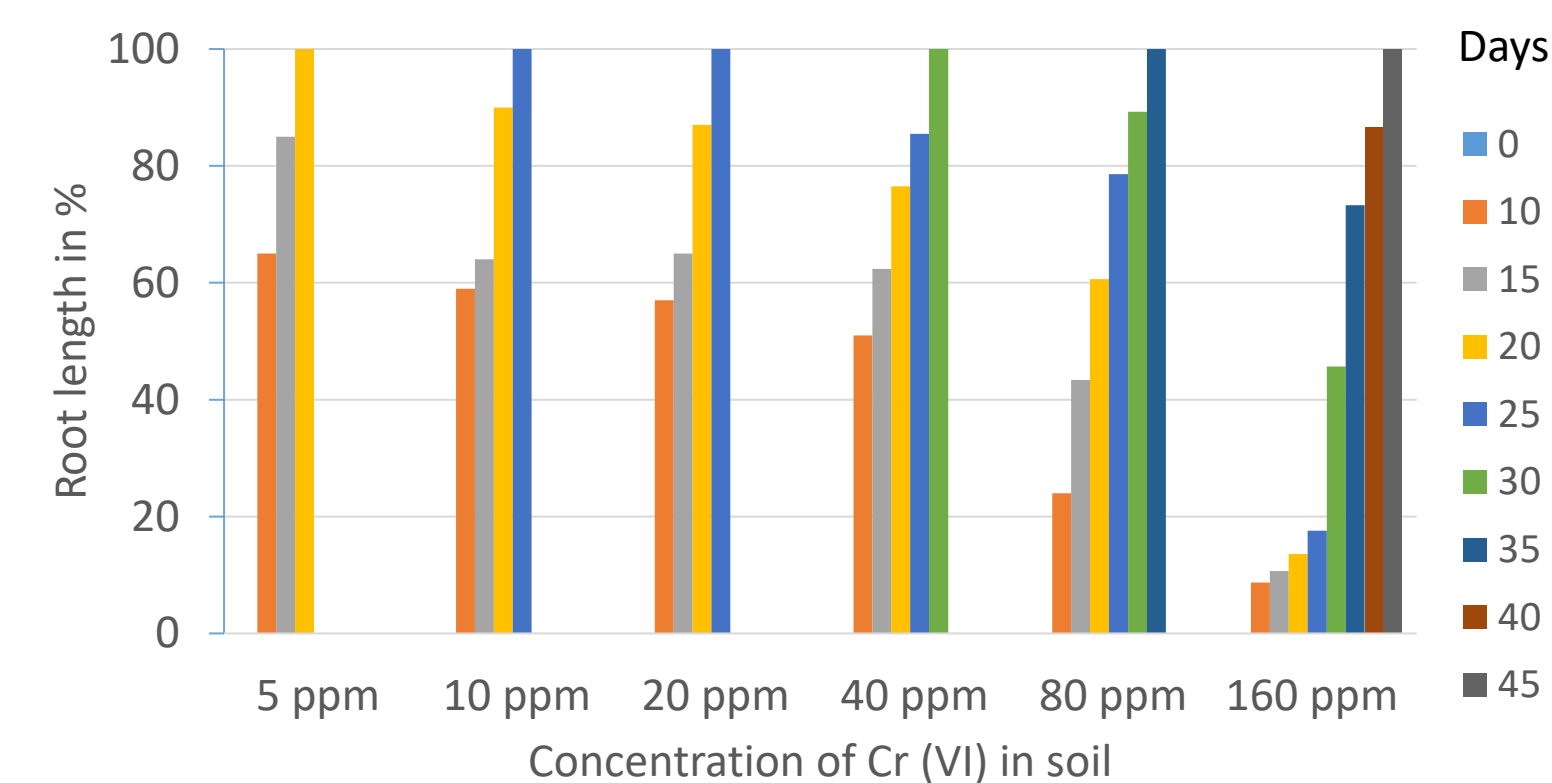
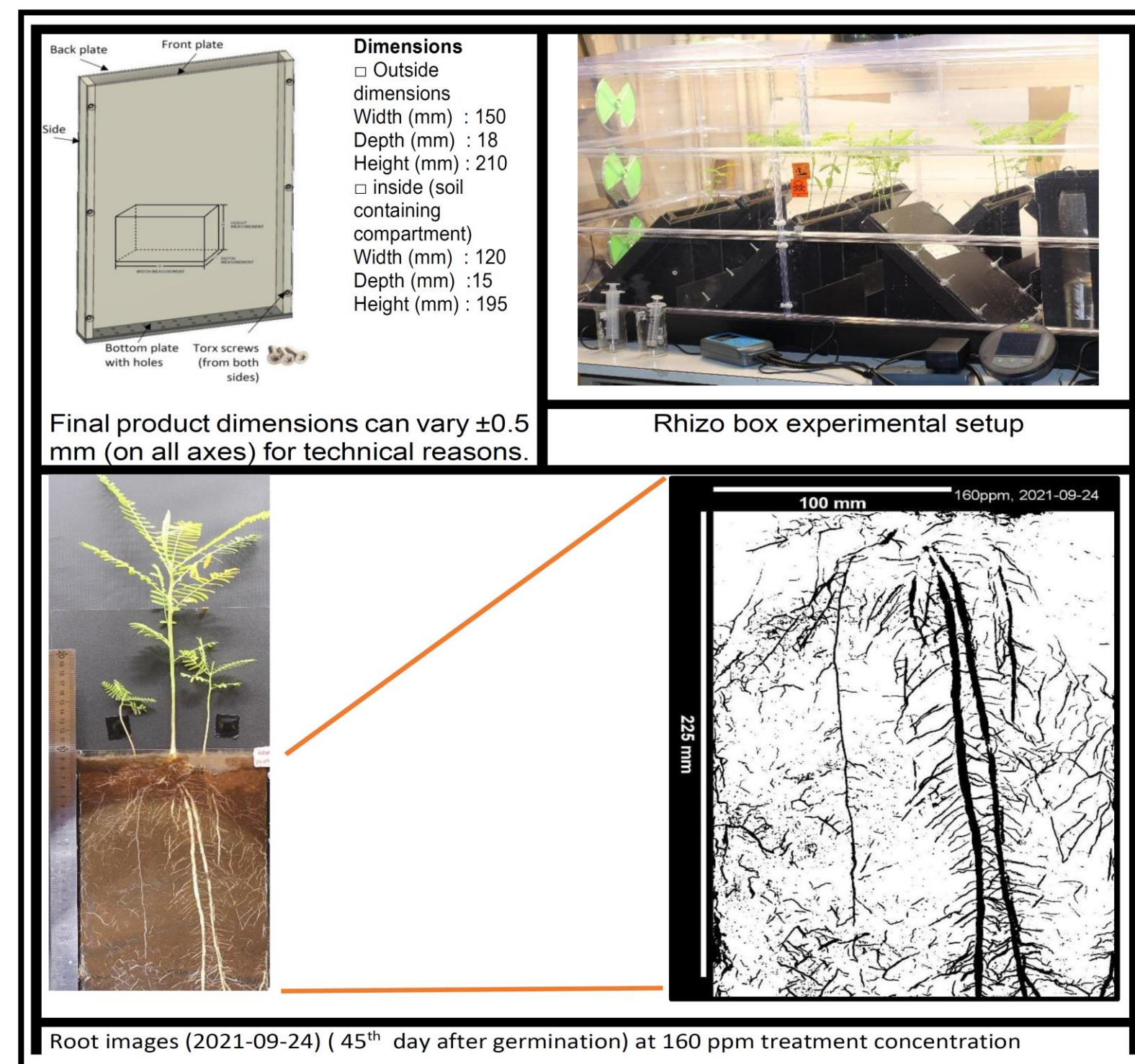


Figure : Root length % (up to 225 mm) (n=3)

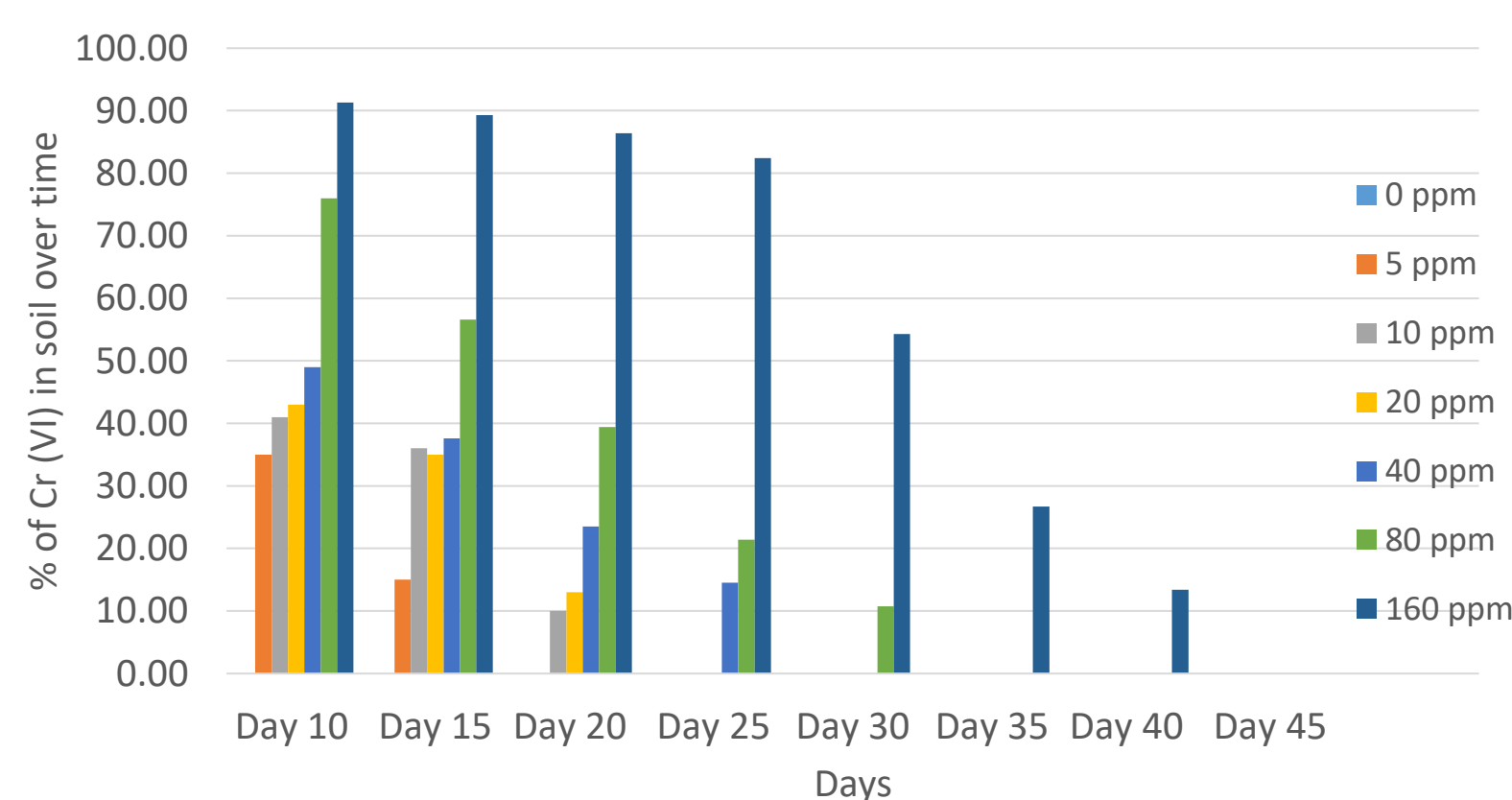


Figure : Decrease in Cr (VI) concentration over time for different dose of Cr (VI) contaminated soil (n=3).

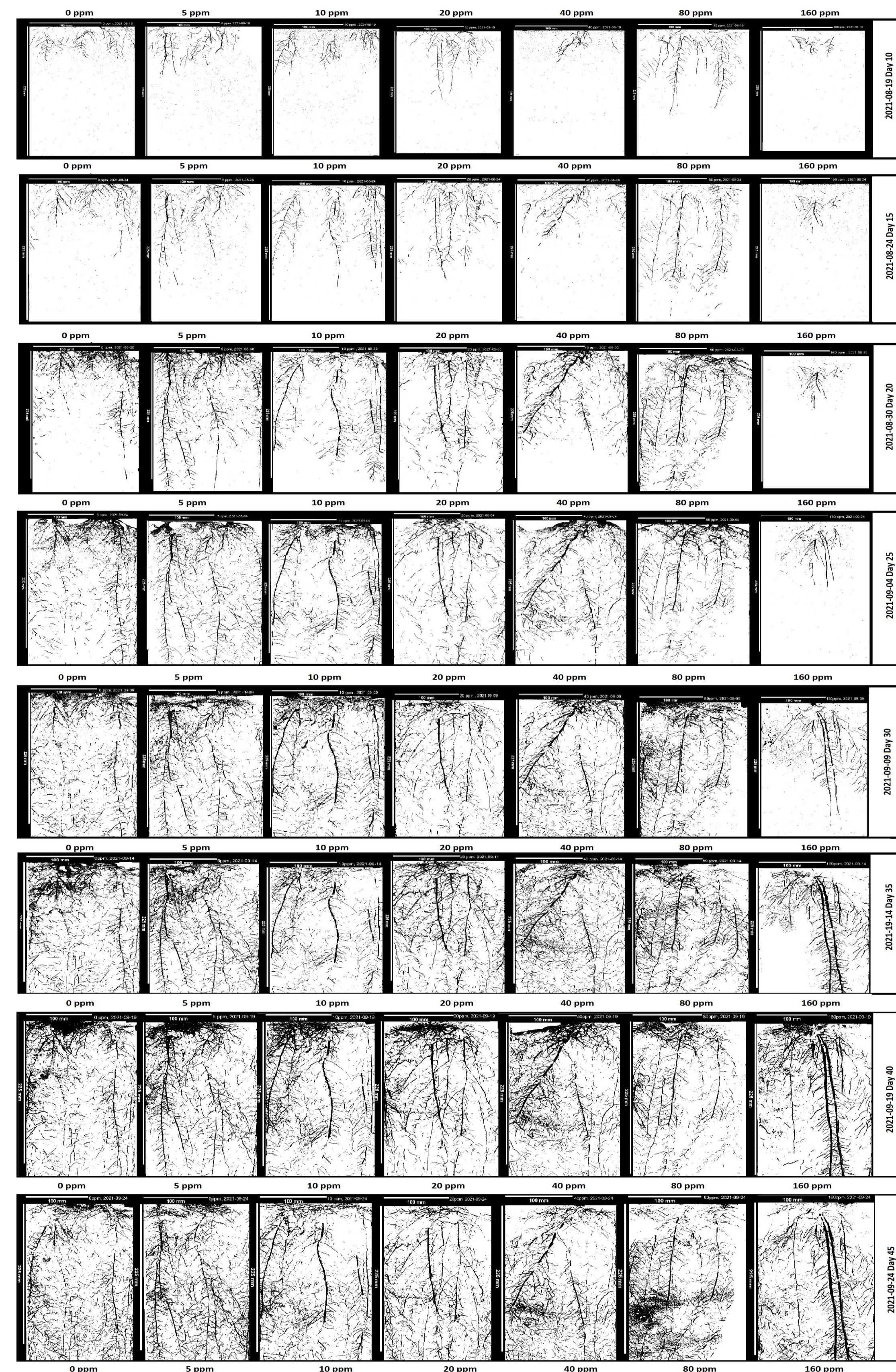


Figure : Root growth over time for plants grown in different concentration of Cr (VI).