

Potato growth under environment chamber conditions

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Potato (*Solanum tuberosum* L.) is one of the world's most common vegetable, source of calories, essential nutrients and vitamin C. Most studies with potatoes are performed *in vitro*, under strict environmental conditions and high levels of asepsis. Integrated in a larger research study that aims at simulating *in vivo* conditions for application of nematicides for potato pest control, this study intended to evaluate the best growth chamber conditions for potato growth. To optimize the best conditions, type of substrate, potato variety, seed depth, day/ night period, environment conditions and watering/ fertilization routine were evaluated between September 2018 and February 2020 in 14 trials with 20 plants each. In March and in June 2020, 16 potato seeds were placed in 3 L plastic pots, filled with pine forest sand and composted pine bark (9:1 ratio). Plants were grown in an Aralab© D1200PLH chamber at MED/ U. Évora facilities. Day period was set to 14 h, 23°C and 50% relative humidity and night period to 10 h, 12°C and 70% relative humidity. Plants were routinely watered and fertilized. Destructive sampling was performed 7, 14, 21 and 28 days after plant emergence (DAE). Non-destructive sampling was measured every 2 days, starting on the 7th day after emergence. Biomass related parameters (height, fresh weight, leaf area, etc.) increased as plant develops, with some overlay between consecutive time-points. Stomatal conductance, chlorophyll content and chlorophyll fluorescence values are more variable as plants grow. A plant with 14 DAE has a maximum quantum efficiency (F_V/F_M) value of 0.82 and an average Performance Index (PI_{abx}) of 7.91; a plant with 28 DAE has an average F_V/F_M value of 0.83 and an average PI_{abx} of 8.10. Leaf chlorophyll content varied between 73.66 for a 14 DAE plant and 80.20 for the 28 DAE plant (SPAD index).

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