**Effects of water stress on the growth, physiology and biochemical properties of oil palm seedlings**

ABSTRACT

Climate change poses significant challenges to the production of oil palm as its output can be directly affected by abiotic stress, especially drought. Thus, this research was designed to investigate the effect of different water stress regimes on the physiology of oil palm seedlings to determine the optimum amount of water that should be applied. Three-month-old Tenera hybrid (Dura X Pisifera) oil palm seedlings were arranged in randomised completely block design (RCBD) and treated with four irrigation regimes: 100% ER (evapotranspiration replacement; well-watered), 75% ER (moderate water stress), 50% ER (high water stress) and 25% ER (severe water stress). Growth, carbon assimilation and biochemical parameters were recorded during the experiment. The results showed severe water stress decreased vegetative plant growth, leaf water potential, relative water content, leaf moisture content, stomatal conductance, transpiration rate, net photosynthesis, water use efficiency and fv/fm (maximum efficiency of photosystem II). The level of malondialdehyde (MDA) and proline increased under water stress. Regarding irrigation, 100% ER (control) was most effective on most parameters, but there was no significant difference to 75% ER. Thus, to optimise the water utilisation, supplying 75% water from soil field capacity on oil palm seedlings is the best option.

**Keyword:** Oil palm seedlings; Climate change; Water stress; Evapotranspiration; Physiology