

## PHYSIOLOGICAL RESPONSE OF OF *HOPEA ODORATA* ROXB. AND *MIMUSOPS ELENGI* LINN. SEEDLINGS UNDER COMBINED NUTRIENT AND WATER STRESSES

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**Abstract:** The physiological response of *Hopea odorata* and *Mimusops elengi* seedlings under drought and various fertilisation rates subjected to nursery conditions was investigated. The experiment was a 6 x 2 factorial design and slow release fertilizer (Best Tab, 20:10:5 NPK) was applied once at the beginning of the experiment and was placed 10cm below the surface in tablet form (NPK 20:10:5). The watering treatments were no stress (seedlings were kept well watered at field capacity  $\geq$  - 0.3 MPa) and water stress (water was withheld until the soil water potential was  $\geq$  - 1.5 MPa and then rewatered to field capacity). Physiological measurements were made on mature fully-expanded leaflets of the seedlings. Both species responded differently to conditions of drought and fertilisation with *H. odorata* seedlings receiving 30g of fertiliser under well-watered conditions had the highest rate of photosynthesis and stomatal conductance throughout the 12-month period. In contrast, *M. elengi* seedlings receiving 50 g of fertilizer application recorded the highest rate of photosynthesis and stomatal conductance. Both species exhibited drought tolerance via maintenance of high water potential at the end of 12-month experimental period. They possess "sensitive stomata" or stomata which close rapidly on exposure to water stress. Such a stomatal response may effectively reduce water loss and maintain high water content during water stress in the urban area. Another important factor is that photosynthetic processes can still be carried out under water stress although at a reduced rate. Fertilisation reduces the impact of drought through its effect on stomatal closure thus reducing transpiration increasing photosynthetic rate and maintaining a much more positive internal water balance which is vital for almost near normal plant functioning.

**Key words:** *H. odorata*, *M. elengi*, urban environment, drought, fertilization, plant growth

### INTRODUCTION

Trees growing in the urban environments are subjected to the harsh above and below ground growing environments. The above ground factors causing stress in urban trees include radiated heat from buildings, car tops, concrete, wind and