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Effect of water deficit during flowering on growth and morpho-physiological responses in sesame (*Sesamum indicum* L.)

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Abstract

Sesame (*Sesamum indicum* L.) is an oil-seed and cash crop with high nutritional and added values. In semi-arid Senegal where drought often occurs during crop development, its cultivation is recent and its promotion is largely recommended by the government for fighting against the poverty considering the high interest for the rural populations. The purpose of this study is to characterize the agro-physiological responses and identify potential screening criteria for selection for drought tolerance. Soil moisture (θ_v), leaf area index (LAI), mid-day leaf water potential (ψ_{md}), the difference between canopy and air temperature (Tc-Ta), net photosynthesis (Pn) and maximal yield of photochemistry (ratio of F_v : variable fluorescence to F_m : maximum fluorescence = ΦP_0) were measured during flowering-capsule production stage. Water consumption, considering RET_{cycle} (real evapo-transpiration during the whole cycle), of 249 mm and 184 mm were recorded for well watered and stressed treatments respectively. After the with-holding of the irrigation, the decrease in ψ_{md} and Tc-Ta was noted earlier (18 Das) than in LAI (24 Das), Pn and ΦP_0 (28 Das). Low grain yield and number of capsule per plant were also induced by water deficit. Hence, ψ_{md} , Tc-Ta and chlorophyll a fluorescence considering ΦP_0 can be used as destructive (ψ_{md}) and non-destructive (Tc-Ta, ΦP_0) tools respectively in screening for drought resistance in sesame.

Keywords : water deficit, responses, drought tolerance, sesame (*Sesamum indicum* L.), Senegal.