Photosynthetic Light and CO_2 Response Parameters of Two Pepper (*Piper nigrum* L.) Varieties Ready for Field Planting

Malawisinghe M.M.G.S., Weerasinghe L.K.[*], Piyarathne P.N.M.S.[1] and Geekiyanage N.[1]
Department of Crop Science,
Faculty of Agriculture, University of Peradeniya, Sri Lanka

Recent research on pepper is mostly focused on improving agronomic management and productivity, however, less attention is given for understanding the underlying physiological basis of dry matter production. Since photosynthesis plays a key role in determining how much dry matter is produced by plants, quantification of CO_2 (A-Ci) and light (A-I) response curve parameters is a better way to understand photosynthesis and dry matter production. Thus, this study focused on two currently popular black pepper varieties (Dingirala and Panniyur-1) that were ready for field planting, with the objective of determining varietal variation in photosynthetic light and CO_2 response parameters. The pepper plants were arranged according to a Completely Randomized Design (CRD) then the A-Ci and A-I curve data collected were fitted to an asymptotic exponential model by non-linear regression using *R* software. According to the results, no significant (P=0.05) difference was found between Dingirala and Panniyur-1 related to light response curve parameters (LSP, P_{max}, AQY, R_D/Ag) except for the light compensation point (LCP) and leaf dark respiration (R_D) (P<0.05). Further, no significant (P=0.05) difference was found between Dingirala and Panniyur-1 related to CO_2 response curve parameters (V_{cmax}, J_{max}, V_{cmax}/J_{max}, CCP, R_L). According to the overall results, both Dingirala and Panniyur-1 nursery plants performed equally in relation to photosynthesis when both varieties are ready for field planting. Furthermore, after field establishment, physiological trait exploration is recommended to investigate potential varietal variation at the field level.

Keywords: Black pepper, CO_2 response curve, Light response curve, Photosynthesis

[1]Department of Plant Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka
[*]lasanthaw@agri.pdn.ac.lk