



Temporal Variations of Carbon Dioxide Flux above growing Cowpea (*Vigna unguiculata* (L.) Walp) at an Agricultural Site in Ile-Ife, Nigeria

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The aim of this study was to investigate temporal variation of carbon dioxide (CO₂) flux above cowpea (*Vigna unguiculata* (L.) Walp) in relation to phenological stages of growth. The experimental site was an agricultural area located in the Teaching and Research farm of Obafemi Awolowo University, Ile-Ife, Nigeria. The planting of cowpea covered two cycles, March/June and August/November, 2015, which represented dry-to-wet and wet-to-dry seasonal transitions in the area respectively. An eddy covariance system was deployed on site from which turbulent flux of carbon dioxide has been determined. In addition, net radiation, Photosynthetically active radiation (PAR), leaf surface temperature, and soil moisture and thermal parameters were measured within the plant environment. The concentration of CO₂ at the location decreased by about 50 % to minimum values, roughly 650 mgm⁻³ at 1500 hrs (LT), which is coincident with the maximum PAR value of 1800 Wm⁻². From sunset until dawn, the CO₂ flux measured increased steadily from about 0.2 mgm⁻²s⁻¹ around 1800 hrs to reach maximum value, about 0.5 mgm⁻²s⁻¹ at 0300 hr. Irrespective of the growth stage of the plant, the CO₂ flux during nighttime was maximum.

Keywords: Cowpea, phenological, stages of growth, carbon dioxide, flux and concentration.