Charles-Edwards (6) suggested a simple equation for examining the consequences of change in leaf photosynthetic parameters to canopy $CO_2$ uptake. This is adapted here for use with photon flux and $\phi_{abs}$ (Eq. 1). This equation assumes a rectangular hyperbolic response of the rate of $CO_2$ uptake to photon flux over the full range of light levels, an exponential decline in light with depth into the canopy, and a diurnal course of incident photon flux described by a sine function:

$$A_{c,tot} = \frac{\alpha\phi_{abs}Q_{tot}h(A_{sat} + R)(1 - e^{-ks})}{k\alpha\phi_{abs}Q_{tot} + h(A_{sat} + R)} - 8.64 \times 10^4\,(Rs) \quad (1)$$

where terms are as defined previously[2] and $8.64 \times 10^4$ is the number of seconds in a day.