

Shade in Tea Plantations: A Fresh Look

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Shade is considered as a necessary management practice in tea. Some physiological responses of tea due to shade in several experiments are summarized, which stress the importance of shade management in tea.

Photosynthesis is considered as the driving force of plant productivity. The processes involved in leaf photosynthesis can be broadly classified into three main elements which operate in series: Light harvesting and electron transport synthesizing reductant (NADPH-Nicotinamide Adenine Dinucleotide Phosphate) and energy giving compounds (ATP-Adenosine 5' Tri Phosphate) which will be utilized in subsequent reactions, dark reactions of photosynthesis which involves regeneration of RuBP and synthesis of carbohydrates. Photosynthesis and some of these partial processes associated with light reactions were studied in relation to shade. The maximum photosynthesis (A_{max}) of unshaded leaves was found to be nearly 40% less than shaded, indicating the increased capacity of shaded leaves for higher productivity. The total linear electron transport rate was found to be similar in both shaded and unshaded leaves. The allocation of electron transport products to CO₂ fixation was higher in shaded leaves, which was about 50% less in unshaded leaves than in shaded leaves. Conversely, allocation of electron transport products to photorespiration was significantly larger in unshaded leaves. The photosynthesis of field grown tea in several seasons with different climatic conditions showed that when there was high incident radiation intensity, the rates of photosynthesis were significantly low. Fv/Fm, which is measured using fluorescence, is a measure of photoinhibition. This was significantly lower in unshaded tea leaves than in shaded, indicating photoinhibition.

In summary, shade can be considered as essential and beneficial for tea, in addition to the other known advantages such as organic matter addition, nitrogen fixation, harbouring natural enemies of tea pests, moisture conservation and biodiversity aspects. Identification of alternate species of shade trees with favorable microclimate and low competition with tea for tea plantations will have to be carried out in order to sustain the long term stability.