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THE MECHANISM OF PHOTOSYNTHESIS AND NET CROP PRODUCTIVITY IN THE TEA PLANT (CAMELLIA SINENSIS L.)

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Commercial productivity in tea is more directly related to net assimilatory rates than in other perennial crops because the young shoots, dependant for their growth on photosynthetically assimilated carbon, are harvested for the manufacture of tea. Photosynthetic rates have been reported for tea grown in India (Barua 1960) and Malawi (Squire 1971). Physiological and biochemical evidence is however lacking as to whether tea is a C_3 or C_4 plant and also as to the extent to which photosynthetically assimilated carbon is lost by photorespiration (Zelich 1975).

In this study $^{14}CO_2$ has been used in short term feeding experiments to prove that photosynthetically assimilated carbon in tea is metabolised by the C_3 pathway. Gas exchange measurements using an Infra Red Gas analyser have been used to measure the rates of photosynthesis and photorespiration both in young greenhouse plants as well as in excised shoots from plants grown in the field. It was found that photorespiratory loss of carbon was in the range 19-24% of the photosynthetic rate.

Although there is no direct correlation between the yield potential of clones and the net photosynthetic rates as measured under the experimental conditions of this study, comparison of the data presented here with those of Wettasinghe (1978) would suggest that the yield potential of tea clones may be closely related to the mechanism controlling the partitioning of assimilates within the plant.

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