EFFECT OF WATER DEFICIT ON RuBP CARBOXYLASE ENZYME ACTIVITY AND ULTRASTRUCTURE OF CHLOROPLAST IN LEAVES OF CHRYSALEDOCARPUS LUTESCENCE

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One limitation to photosynthesis under long term water deficit is the reduced activity of photosynthetic enzymes. Under such conditions the activity of RuBP carboxylase enzyme is reduced by inhibiting the synthesis or conformational changes in the enzyme. In Chrysaledocarpus lutescence palm CO_2 assimilation was sensitive to leaf water potentials in the range of -1.2 to -1.5 MPa, but in vitro activity of RuBP carboxylase enzyme was not decreased.

In the present study C. luterscence palms were grown under field capacity (FC) 50% FC, 25% FC, 10%FC and their corresponding leaf water potentials were -0.5, -1.0, -1.2 and -1.5 MPa, respectively. The net rate of photosynthesis of attached leaves varied from 0.0 - 0.2 mg CO_2 m^{-2} s^{-1} for 10% FC treatments. The mean enzyme activities for FC, 50% FC and 25% FC soil moisture treatments were 6.5, 5.8 and 6.8 nmol $CO_2 min^{-1} mg^{-1}$ protein, respectively. These values were not significant although the net rate of photosynthesis was drastically reduced.

Electron microscopic studies revealed that with increase in soil moisture deficit, stromal area of the chloroplasts were increased, but the general organization of granal and intergranal lamallae were not disrupted. Under moisture deficit, some chloroplasts contained square or rhobidal structures with regular crystalline arrays. Those structures were similar to RuBp carboxylase enzyme crystals.