

## **About the Book**

*Although the role of plant in determining earth's climate is generally acknowledged, our understanding of plant is very rudimentary. The author has attempted to present a comprehensive and unified approach to plant physiology, with emphasis on the energetics of transport process. The present approach is line with P. Mitchells' s theory of proton motive force as the source of energy for symport antiport processes in all cell membranes .Beginning with the energy transduction process in the chloroplasts and mitochondria. We realize that a symbiotic relationship exists between the photosynthesizing leaves and the respring heterotrophic tissues of the plant. The former are engaged in reduction reactions, which consume protons, while the roots and other sinks are engaged in oxidation reactions which produce H'. The present approach is an extension of mitchell's theory of symport and antiport processes across cell membranes by applying the theory of electrokinetic phenomena and the principles of irreversible thermodynamics to the transport pathways of plants. We have been able to thereby formulate a comprehensive theory of plant regulated by the diverse metabolic activities of plant tissues. We not only resolve the problem of "PH-stating" in the two sets of tissues but also obtain the metabolic source of energy for transport in plants. We see that plant transport is not driven by inanimate agencies like transpiration and osmotic pressure alone but is rather governed by plant's metabolism. This view point has been often suggested but the currently accepted are only limited variations of the 1895 and 1930 models of jolly Dickson and Munch, respectively. As living organisms, plant have to be in a position to acquire nutrients of the kind and at the rate at which these are required and hence both sinks and sources must regulate transport by their own activity in harmony with their metabolism at any time of the day and season. It has been probably the lack of recognition of the wide and diverse faculties of plant by earlier physiologists who assigned plants an inferior status of living state compared to species of animal Kingdom.*

### Contents:

#### **Part 1: Basic information**

1. Physics
2. Basic biochemistry
3. Bioelectrochemistry

#### **Part 2: Transport system in plants**

4. Long distance transport
5. Current models of plant transport

#### **Part 3: Cellular metabolism**

6. Energy and matter flow in mesophyll cells
7. PH regulation
8. Stomata guard cells

#### **Part 4: ATP: structures, synthesis and reactions**

9. ATP as carrier of -P
10. Free energy of ATP Hydrolysis
11. Proto-osmosis

#### **Part 5: revised approach to transport phenomena**

12. A unified mechanism for all transport processes