The intelligent entelechy of plant growth

Chapter B

Structure and functions of the intelligent behavior of plants

Subsection 6

Biological phenomena as senses

1.Sense as vision

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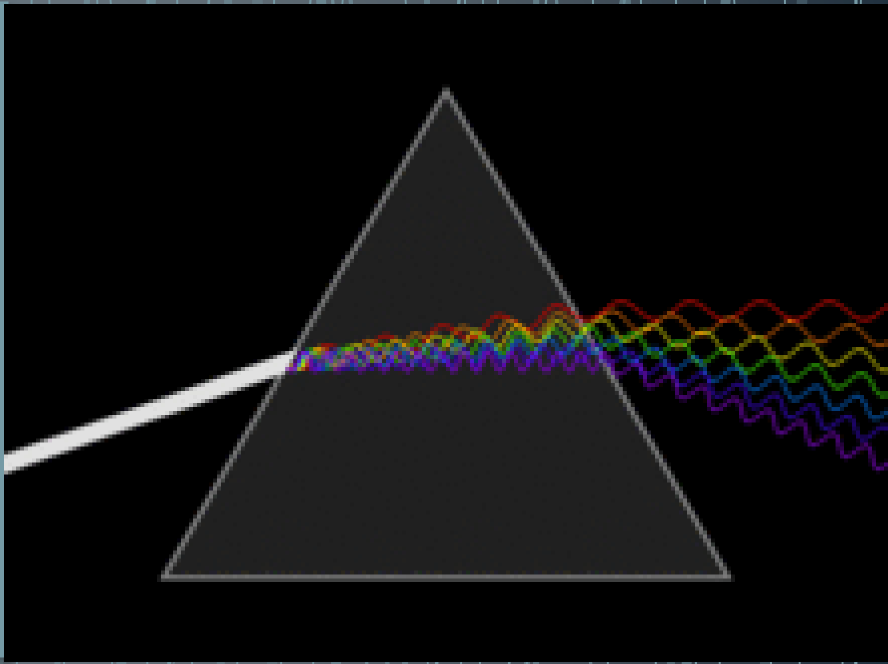
If the eye term, mean only those organs which bring about the perception of the image, then the leaves on foliage and many animals are blind. But if the term is extended, to include instruments that can see the difference in light intensity, then the plants should be said, that they have eyes.
Gottlieb Haberlandt (1854 -1945)

A tree says!....
I was made to form and reveal the eternal in my smallest special detail.
Hermann Hesse (1877-1962)



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Prologue

The plants remain rooted at the same place, the sensations which if they have, would be extremely important.

Plants are living organisms, which do not have nerves or sensory organs, such as animals.

For the perception of the environment, plants have sensitive receptors, for receiving external stimuli, such as the detection of light, is done which is achieved with light-sensitive receptors.

The plant growth is influenced by many environmental stimuli, including light, temperature and gravity etc.

From these stimuli, light is particularly important because as plants are depended on light energy for their survival.

Moreover, almost all stages of plant growth is partly regulated by light via the action of the various photosensitive systems.

Plants have no brains or anything resembling to a brain, for the process of external or internal informationes, which is important for the image formation, from the environment.

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How can an organism without eyes is perceives the characteristics of light? "The energy transfer to the light harvesting macromolecules, assisted by special vibrations, movements of chromophores".

Other biomolecular processes, such as electron transfer agents in macromolecules (as in reaction centers in photosynthetic systems), the structural change of a chromophore upon absorption of photons, (as in vision processes) or identifying a molecule from one another (as in smell procedures) affected by specific vibrational motions.

Therefore, the results of this research, suggest that a closer examination of pulse dynamics involved in these processes, could provide other biological prototypes actually operated, non-classical phenomena.

Quantum mechanics therefore explains the efficiency of photosynthesis.

Although plants do not have nerves, cells in plants are capable of producing electrical pulses called (AP) action potentials, as they do in animals nerve cells. For example, stimulation of a leaf cell, with light, generates a series of electrochemical events in the entire plant, which communicate via

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specialized cells, called "cells of the vascular sheath" just as electrical impulses, propagate along the nerve cells, in an animal's nervous system.

The electrical signaling in plants is known since Darwin, and Bose, this is nothing new. But what it is do not described, is that the light can cause action potentials.

We have found that there is a different signaling for the blue, white and red light.

If plants can signal differently, different wavelengths of light, then the plants may view the colors, also (Stanislaw Karpinski).

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Plants are bombarded by a myriad of signals, not just from their physical environment, but from friend and foe alike.

As a consequence, they have evolved a remarkably sophisticated system of receptors and signal transduction pathways that generate appropriate responses. That light plays a major signaling role in plant development which is not surprising.

A plant's ability to maximize its photosynthetic productivity depends on its capacity to sense, evaluate, and respond to light quality, quantity, and direction.

Likewise, the timing of developmental phenomena, such as flowering or entrance into dormancy, depends on a system of measuring and responding to changes in daylength.

A red, far-red-reversible chromoprotein, phytochrome, was the first photoreceptor identified.

It is now known that multiple phytochromes exist and sometimes act independently of one another, sometimes redundantly, sometimes antagonistically, sometimes at the same time in development, and sometimes at different times.

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The first blue-light receptors to be identified were the two cryptochromes, chromoproteins that mediate several responses. More recently,(Winslow R. Briggs and Margaret A. Olney 2001) another blue-light-absorbing chromoprotein, phototropin, has been identified as a photoreceptor mediating phototropism[1].

Plants have gained a high degree of developmental plasticity to optimize the growth and reproduction in response to the environment, such as light, temperature, humidity, and salinity etc.Plants utilize a wide range of sensory systems to perceive and transduce specific incoming environmental signals. Light is one of the key environmental signals that influences plant growth and development.

In addition to being the primary energy source for plants, light also controls multiple developmental processes in the plant life cycle, including seed germination, seedling de-etiolation, leaf expansion, stem elongation, phototropism, stomata and chloroplast movement, shade avoidance, circadian rhythms, and flowering time (Deng and Quail,1999; Wang and Deng, 2003; Jiao et al., 2007). Plants can monitor almost all facets of light, such as direction, duration, quantity, and wavelength by using at least four