



## IMPLICATION OF FLOWER COLORS TO HUMAN BEINGS AND INSECTS

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### ABSTRACT

*Flowers owe their beauty to their infinite range of shapes and colours and are symbolized with spiritualism and expression, conveyance of sentiments of human beings. On the other hand plants employ flowers to form association with animals to ensure pollination across multi – generation. To achieve this they provide clues and positive enforcements. The diversification in flower colours and other attributes has matched in nature with co-evolution of abundant species of insects. This paper deals with the perception of flower colours by insects and also their denotions to human beings.*

Key words- symbolism, perception

Flowers are appreciated for the beauty of their colorful and scented blooms. They are considered as wonderful creation of nature . Flowers exhibit virtually endless variety of spectral signatures. Perception of this spectrum of color stimuli is found to trigger corresponding emotional and behavioural responses in human beings . The practice of assigning symbolic meanings to flowers is known as floriography. Some of the meanings are depicted in table.

Table 1 -Symbolism of flower colors

Color	Symbol
Deep blue	Peace, openness, serenity, vastness
Pink	Grace, happiness, admiration gratitude
Purple	Dignity, pride, success
Red	Passion, desire, love
White	Innosense, reverence, purity, simple beauty, chastity
Yellow	Joy, friendship, caring, platonic emotion
Orange	Enthusiasm, warmth, confidance, fascination
Green	Youth, optimism, resilience, harmony
Black	Death, farewell, death of relationship, annoyance

The color of flowers not only entice human beings but also insects. Preference for flower color has been shown by number of studies (Pederson 1967, Kay 1976, Lelegi 1973).

Table- 2- Flower colour attraction of insects

Insect type	Flower color to which they are attracted
Bees	Blue, Yellow
Beetles	White, cream, green
Butterflies	Strong pink, red
Moth	Cream
Wasp	Purple, blue



Relationship of flowers and insects is one of benefit and enhancement. Flowers provide nutrition in the form of nectar while insects help in cross pollination i.e. in transferring male genetic material in the form of pollen to female organ, gynoecium of another flower, the color of flower is attributed to the presence of phytochemicals Anthocyanins classified as flavanoids. Their color depends on the pH of the cell sap eg. Pink in acidic, purple in neutral, greenish and yellow in alkaline solutions. (Harborne 1988, Michaelis, Schubert and Smythe 1936). Flavonoids are polyphenolic compounds that are ubiquitous in nature and are categorized according to chemical structure into flavonols, flavones, flavanones, isoflavones, catechins, anthocyanidins and chalcones. The floral flavanoids often in combination with UV reflective carotenoid pigments form UV visible patterns. (Harborne and Grayer 1994 in Annual Review) which are visible to insects but not to humans. According to Guldberg and Alstart (1975) flowers of about 33 % of all species strongly reflect UV light. This reflection pattern provides the pollinator with the appropriate clues of the location of nectaries and of individual flower in inflorescence thereby facilitating orientation of insects on flower for the transfer of pollens. The reception of UV pattern plays a role in selection of flower by insects.

Insects cannot perceive red but are capable to see other colors including UV light (Lubbock 1882). Honey bees have been shown to perceive the sum of two primary colors as a new color. So the part of a flower that emits yellow and UV light (UV is a primary to insects) will appear as purple to honey bee. (Thomas einer 2002). Some flowers show color change eg. Lupinus, (Gori 1989) Lung worts, forget-me-not, Delphinium (Perry) sending a cue to the insects that a flower is in later stages of development and/ or post pollinated stage and that there is a change in nectar & pollen availability. In this way flowers advertise honestly about their unrewarding state and convey insects not to waste energy by visiting them.

Weiss 1991, Pedersen 1967, Leleji 1973 and Kay 1976 have also reported selection of flower colors by insects.

Thus pollinator behaviour is influenced by morphology and chemical characteristics of flowers. Diversity in floral pattern has aided in evolution of enormous variety of insects (Cruden, Hermann and Peterson 1983) thereby beautifying the nature. In this way flowers are said to fulfil the basic purpose of creation. “Live and Let Live”. Each niche in the nature serve dual purpose one for its own i.e. survival and reproduction and secondly contribute to the flourishing of other individuals. It is this principle that underlines the harmony and oneness found throughout nature.

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