

Consciousness, Feeling and Expression of the Phytodiversity: A Perspective Study from Ancient Indian Literature-A Review

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KEYWORDS *Ayurveda*. Astrology. Bhagavad Gita. Expression of Plants. Feeling. Phytodiversity. *Smriti*. *Tantra*. *Veda*

ABSTRACT Plants possess consciousness, inner feeling and expression, unperceivable by human beings so easily. These facts, in a nutshell form are reflected in the ancient literatures of India, which has provoked the worship of plants since the time immemorial. In course of time, Indian scientists had focused their research on the inner consciousness of plants in the past century and proved worth.

INTRODUCTION

Expression of feelings is called *Abhibyaktee* in Sanskrit. In general human beings express through their own language called *Baakbaikharee*. Like human beings the animal world express through creation of different sounds. Even the micro-organisms express their feelings as revealed from modern research. The expressions that are communicated through the signals of the eyes is called *Passyantibak*. The deaf and dumb express through movement of their limbs and lips as sign language. The visually impaired language is called Braille script used for tactile writing system. The *Yogis* communicate through their mental vibrations (Padhy 2016). A common man also receives such mental vibrations, yet occasionally perceives them due to lack of mental concentration. Expression of thoughts is perfectly developed among the plants, but commonly we are not aware of them. This communication is devoted to discuss the consciousness and expression of the plant world as realised in the Vedic age and Indian-Science during the early part of twentieth century.

ANCIENT INDIAN LITERATURE

Study of ancient literature is a constituting dimension in ethno-botanical/biological research (Padhy 1998) and recognised as an established

methodological treatise (Jain 2001). Among the ancient literature of India the *Vedas* (*Rig*, *Saam*, *Yajar*, *Atharava*) and other vedic age literature (*Upaveda*, *Vedaanga*, *Upaanga*, *Smriti*, *Tantra* and *Puraana* with their individual branches) are good source of ethnic knowledge (Mohapatra 2003). Expression of consciousness in any biological system mostly of plants on certain selected Vedic age literature are reflected as follows:

Yajurveda

Two famous versions of this Veda says:

“The whole universe with its living beings (plants and animal) belong to the Lord (Nature). No being is superior to any other, and the human beings should not have absolute power over the nature. Let no species encroach upon the rights and privileges of other species. However, one can enjoy the bounties of nature by giving up greed” (*Yajurveda*-40.1).

“Look upon all the animate beings as your bosom friends, for all of them there resides one soul. Behave with others as you would with yourself. All are but a part of that universal soul. A person who believes them all alike, never feels lonely. He experiences the intense joy throughout his life” (*Yajurveda*-40.6).

Modern Environmentalists consider that, the above advise oriented concepts of ancient India are the top most ideas of mankind to realize the consciousness of the biodiversity (Khashoo 1995). Moreover the plants, animals and micro-organs of the nature work with a sacrifice (*Yajnya*) motive and interact with each other (as their expression) from work culture point of view (Padhy 2013).

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Manusmruti

Smruti refers to ethical law books which include social laws, usages, customs, manners and moral codes. They are post Vedic, with applied sociological value. *Manusmruti* is the first ethical law book of the world which has focused on the consciousness and expression of plants directly.

Tamasaa brahmaroopena beshtitaah Karmahetunaa

Antahsangnyaa bhabantyyete sukhadukha samanuitaah

(Manu, Chapter 1 / Verse 49)

Meaning: These plants which are surrounded by multiform darkness, the result of their acts (in former existences), possess internal consciousness and experience pleasure and pain (Dash and Padhy 1997).

One step ahead "*Manusmruti* has told (Padhy et al. 2001): "According to the usefulness of the several kinds of trees a fine must be inflicted by the administrative authority (King) for injuring them; that is the settled rule (Manu, 8/285)".

"A person is expected to undergo penance if he spoils the plant-diversity such as-green trees for fire wood, fruit trees, shrubs, creepers, lianes, flowering plants, agricultural species and spontaneously growing plants in forest for no good purpose". Penance gives chance for realization to someone who has committed the sin. It rather puts a self-restriction and prevents a person from committing any offence. In *Manusmruti*, chapter 10 is fully devoted to explain about penance. Penance for injuring or spoiling a plant system focuses on their internal feelings and respect of human beings for that consciousness.

Astrology

This branch of vedic literature comes under *Vedaanga* as a branch, popularly known as *Jyotisha*. The Indian Astrological Science is the most advanced one amongst all Hindu attainments in positive sciences of ancient days (Raman 1998). It is a well established fact, that not only the human beings; but, even a minutest creature; may be a plant, animal or microbe is under the influence of the planetary power amenable to the biological world. Astro-ethnobiology is an emerging branch under the science Ethno-biology (Padhy et al. 2005a, b; Dash and Padhy 2015) is committed

to explain the interaction between the biological world and planetary system with modern scientific views.

The mother earth is surrounded by 27 *Nakshatras*. Apparently the earth maintains its dynamics through them. A person's birth *Nakshatra* is determined from the position of the earth during his birth time. As per the epics 'Buddhi Prakash' and 'Naaradeeya Samhitaa', a specific plant is allotted for a person, which is auspicious for him. In the horoscope, when he suffers from planetary impact concerned to his birth *Nakshatra*, he is expected to go for a sustainable maintenance of the prescribed specific plant to overcome the problem. The list of plants for the above type of remedy are depicted in Table 1.

Moreover, to overcome the ill effects of the nine planets, the following plants are worshipped as depicted chronologically (Table 2).

Plant worshipping is a very age old tradition in India. *Ocimum sanctum* (*Tulasi*) tops the list which is worshipped every day almost in every house in Hindu families. To overcome all sorts

Table 1: List of plants for sustainable maintenance of specific birth *Nakshatra*

Name of Nakshatra	Specific plant for sustainable maintenance
Asswini	<i>Strychnos nux-vomica</i> (Bishadra)
Dwija	<i>Phyllanthus emblica</i> (Aamalaki)
Krutikaa	<i>Ficus racemosa</i> (Dimri) or <i>Datura sp</i> (<i>Dudura</i>)
Rohini	<i>Sisymbrium cumini</i> (Jamukoli)
Mrugasheera	<i>Acacia catechu</i> (Khaira)
Aardra	<i>Aquilaria agallocha</i> (Aguru)
Punarbasu	<i>Bambusa sp</i> (Baunsa)
Pushyaa	<i>Ficus religiosa</i> (Pippala)
Asslesha	<i>Mesua ferrea</i> (Nageswara)
Magha	<i>Ficus benghalensis</i> (Bara)
Poorba Phaalguni	<i>Butea monosperma</i> (Palaasa)
Utaara Phaalguni	<i>Ficus religiosa</i> (Pippala)
Hastaa	<i>Myristica fragrans</i> (Jaaiphala)
Chitraa	<i>Aegle marmelos</i> (Bela)
Swaati	<i>Terminalia arjuna</i> (Arjuna)
Bisaakhaa	<i>Ixora coccinea</i> (Rangani)
Anuraadhaa	<i>Millingtonia hortensis</i> (Nagamalli)
Jyesthaa	<i>Bombax ceiba</i> (Simuli)
Moolaa	<i>Shorea robusta</i> (Saala)
Poorbashaadhaa	<i>Calamus viminalis</i> (Jalabeta)
Uttarashaadhaa	<i>Artocarpus heterophyllus</i> (Panasa)
Sshrabanaa	<i>Calotropis procera</i> (Arakha)
Dhanisthaa	<i>Prosopis cineraria</i> (Samee)
Sstabhishaa	<i>Neolamarckia cadamba</i> (Kadamba)
Poorbabhaadraa	<i>Mangifera indica</i> (Aamba)
Uttarabhaadraa	<i>Azadirachta indica</i> (Nimba)
Rebatee	<i>Madhuca indica</i> (Mahula)

Table 2: Plants to be worshipped to over-come the ill effect of planets

Planets	Plants
Rabi (Sun)	<i>Citrullus colocynthis</i> (Mahaakaala) and <i>Aegle marmelos</i> (Bela)
Chandra (Moon)	<i>Carissa spinarum</i> (Kshirakoli)
Mangala (Mars)	<i>Hemidesmus indicus</i> (Ananta moola, Sugandhi)
Buddha (Mercury)	<i>Agyreia nervosa</i> (Brudhdadaaraka)
Bruhaspati (Jupiter)	<i>Tricholepis glaberrima</i> (Braahmana jhaatia/Bhrahmadandi)
Ssukra (Venus)	<i>Adhatoda vasica</i> (Basanga) and <i>Desmodium heterocarpon</i> (Krushna parni)
Ssani (Saturn)	<i>Phyllanthus fraternus</i> (Baadianla)
Rahhu	<i>Santalum album</i> (Sweta Chandan)
Ketu	<i>Withania somnifera</i> (Asswagandhaa)

of the planetary adverse effects two plants, *Ficus benghalensis* (Bata) and *Ficus religiosa* (Aswattha) grown and established together at one place in temples and courtyard dwellings, are worshipped. This shows that, the blessings of the concerned plant helps to overcome the astrological negative impacts, a strong basis to realize the expression of feelings of the plants. Use of plant parts in Talisman or offering to planet Gods as per Astrology to overcome the planetary ill effects are discussed elsewhere (Dash and Padhy 2015). All these applications confirm the metaphysical character expression of the plants.

Vaastu Effect

Vaastu Saastra is considered as an applied aspect of Astrology, which deals with the location, direction, geometrical situation and internal arrangement including the direction of human dwellings which has an effect on health, happiness, success and harmonious relationship of the inmates. The *Vaastu* influences on human beings are based on the cosmic impact of sunlight and heat, the direction of wind, earth's magnetic field and the influence of cosmos on our planet earth (Reddy 1992). Astrology claims that the plants around the dwelling environment envisage a *Vaastu* effect as follows:-

If the following plants are available in housing area, it is deemed to be auspicious. Some of the fruit trees such as *Musa sapientum* / *M. paradisiac* (Kadali), *Cocos nucifera* (Naarikela / Nadiiaa), *Artocarpus heterophyllus* (Panasa),

Mangifera indica (Aamba), *Carica papaya* (Amruta bhandaa), *Emblia officinalis* (Anlaa), *Areca catechu* (Guaa), *Psidium gujava* (Pijuli), *Phoneix sylvestris* (Khajuri), *Citrous reticulata* (Kamala), *Aegle marmelos* (Bela) and *Punica granatum* (Daalimba) are important. Similarly, flowering species: *Jasminum auriculatum* (Jui), *J. grandiflorum* (Jaai), *J. multiflorum* (Kunda), *J. sambac* (Malli), *Michelia champaca* (Champaa), *Gardenia jasminoides* (Sugandharaj), *Ervatamia divericata* (Tagar / Taraata) and *Mimusops elengi* (Baula) are considered auspicious. Moreover, the natural existence of these plants in an area considered to be ecological indicators to accept the plot, fit for dwelling purpose. Existence or introduction of various species of *Asparagus* (Sataabari), *Punica granatum* (Daalimba) in the gardens envisage better growth of other plants. This interaction requires further study from ecological point of view. *Aloe vera* (Ghruta kumaari) is well established as a neutralizer of negative planetary effects. Plantation of *Aloe vera* in the court yards is a rich culture of the South Indian families.

Aloe Vera has a specific Sanskrit name *Putradaa* (gives a son). It is claimed that, sincere worship of this plant daily by a young lady puts impact on her reproductive system to bear a male child. The medicinal effect of the plant cannot be ruled out.

After construction of the house the occupant should be conscious of the existing plants and simultaneously go for new plantations programme as well, in the premises; because, specific plants in specific direction exhibit negative effect for the dwellers (Table 3) as recorded in Maharshi Paraasara's 'Siddhaanta' epic. Anywhere in the premises, if the following plants exist, results weapon hazard to the dwellers. They are: *Bauhinia tomentosa* / *B. Variagata* (Kaanchana), *Clitoria ternatea* (Sukla Apraajitaa), *Jasminum angustiflorum* (Banamalli), *Aganosma caryophyllata* (Maalati), *Tamarindus indica* (Tentuli), *Butea monosperma* (Palaasa), *Feronia limonia* (Kaitha), *Neolamarckia cadamba* (Kadamba), *Musa ornate* (Banakadali), *Citrus grandis* (Tabhaa), *Breynia vitis-idaea* (Jajhaangi), *Indigofera* sp (Neela vruksha).

Many a time small siblings occur naturally in the gardens due to natural seed dispersal. Such plants are: *Azadirachta indica* (Nimba), *Acacia catechu* (Khaira), *Ricinus communis* (Jadaa, Kaala), *Datura* sp. (Duduraa) etc. which causes unwanted expenditure and wastage of finance leading to

Table 3: Negative impact of plants situated in different directions of the house

S. No.	Existing Plant	Direction	Negative effect
1.	<i>Ficus religiosa</i> (Asswattha)	East	Wants, poverty and health hazards
2.	Any latex secreting plant	South-East	Unwanted administrative and judiciary pressure
3.	<i>Erythrina suberosa</i> (Paaladhuaa) <i>Tamarindus indica</i> (Tentuli)	South	Continuous danger all around
4.	Any thorny plant	South-West	Continuous fear psychosis from rivals
5.	<i>Ficus benghalensis</i> (Bata)	West	Internal conflict along with female adultery in house.
6.	<i>Bombax ceiba</i> (Saalmali)	North-West	Breakage of friendship
7.	<i>Ficus hispida</i> (Baidimiri)	North	Enmity with others, may lead to death of house owner.
8.	Any plant with red flower	North-East	Fire hazard in the house

economic set back; hence directed the house owners to uproot such plants time to time.

Analysis of Table 3 clearly indicates that specific plants located in specific directions of the house release some metaphysical vibrations that causes suffering of the dweller.

Tantra

Under the Vedic literature *Tantra* holds a special position. It is regarded as the fifth Veda in the present time (*Kali Yuga*). The word *Tantra* is derived from the basic term ‘*tan*’ – to save, gives the full meaning that ‘The knowledge which is spread to save’ (Bernard 1989). *Tantra* basically represents manifestation (Padhy 2008). The *Tantra* application of plants is mostly done to have a positive effect in any system specifically. Sometimes it causes also negative impact. *Tantric* application and worship of plants was very wide spread in the past such that, the author (Padhy) has a collection of about 122 plants (each with 4-5 applications) recorded from ancient palm leaf texts. This communication cannot accommodate such literature, however few experiences of the author with positive result is reflected else where (Padhy 2011).

Ayurveda

The Indian Science of Health and Medicine is named as *Ayurveda*, a branch of vedic age literature *Upavada*. *Ayurveda* has extensively explored the medicinal value of 7000-7500 plants for curing different diseases and has gone to the extent to speak that, there is no existence of any plant without some medicinal property. Moreover, in India around 20,000 medicinal plants have been recorded. *Ayurveda* has announced the ethical procedure for collection of medicinal plants. The plants which grow in the premises of a temple, nearer to an ant hill, in a burial ground, in a walking path, around a commonly used well should not be selected for medicinal utility. Even a medicinal plant under infection, effected by fire, grown in odd time, deformed or grown under another big tree also should be avoided for medicine preparation.

The plant collector should go nearer to the plant on an auspicious day and time with humble attitude and pray as follows (Theme is presented).

“Let the Microbes, small animals, reptiles and spirits live on this plant quit this place as quickly as possible by the order of Lord Siva, as I am going to dig this plant to collect it’s various parts to be used as medicaments for the betterment of other beings”.

Again he will utter:

“As earlier the Gods had availed their desired medicine by uprooting you; O medicinal ! like that I am uprooting you to avail the medicines for the healing of other beings”.

By saying the above, he will bow and salute the plant and uproot it for his purpose. The whole theme of all these activity reflects on the honour for the consciousness and feelings of the plant concerned and request it to dedicate self for the curative process of others.

Bhagavad Gita

Gita was scribed 5120 years ago. It speaks about the Global Eco-architecture (Padhy 2019). SriKrishna has elaborated the basic characters of living beings in the chapter 10 of the epic. The Sanskrit word *Bhuta* is used in version 10/4, 5, refers to living beings either plants or animals. All living beings have the following characters.

“(1) *Buddhi* (intellect) (2) *Jnaanam* (wisdom), (3) *Asammohah* (non-illusion) (4) *Kshamaa*

(forgiveness) (5) *Satyam* (truth) (6) *Damah* (self-restraint) (7) *Samah* (calmness) (8) *Sukham* (happiness) (9) *Dukham* (pain) (10) *Bhavah* (birth) (11) *Abhavah* (non-existence, death) (12) *Bhayam* (fear) (13) *Akhyam* (fearlessness) (14) *Ahimsa* (non-injury) (15) *Samataa* (equanimity) (16) *Tustin* (contentment) (17) *Tapah* (Austerity) (18) *Daanam* (Charity) (19) *Yasah* (fame) and (20) *Ayash* (Obloquy). The characters presented by SriKrishna exists in different forms with different intensities in different organisms of the biodiversity, may be completely suppressed in one case or extraordinarily expressed in another organism, with diversified manifestations and evolution.

Further it is said that :

I am the life of all beings (7/9)

I am equally present in all beings (9/29)

I am the consciousness (Life-energy) in living beings (10/22)

I support all creatures by my vital energy (15/13)

Moreover, whatever being is born, the unmoving (plant system) or the moving (Animal World) are a product of the Union of *Kshetra* (the body) and *Kshetrajna* (the discerning intelligent principle that cognizes and governs the body) (13/1, 26). All the above presentations clearly indicate that the plant system equally enjoys all the qualities like animals as per Gita.

Similarly the plant system is enriched with characters like non-violence, equanimity, charity, etc; on the contrary a group of plants are identified as carnivores. The touch sensitivity of Laju Lata (*Miniosa pudica*) is special to focus here. A plant extends its shade, fruits and flowers to a person who injures it with equal equanimity to others, who protects it. The tolerance power of plants is highest compared to any other being (Padhy 1999), which should not be considered as non-sensitivity.

Two characters *Bhavah* (birth) and *Abhavah* (Death) are respectively associated with the beginning and terminal end of the life of any being, either plant or animal. The creation of the above twenty characters are finally attributed to the divinity, may be further evolution and diversity is biological following the principles of the nature.

SriKrishna has told: Among all trees, I am the *Asswattha* (*Asvaithah sarvavrkaanaam*, 10/26). In fact the *Asswattha* (*Ficus religiosa*) plant is worshipped throughout India as a representative

of *Bhagawan Vishnu*. *Asswattha* represents the whole phytodiversity. Interestingly in chapter-15 of Gita, the whole cosmic creation is represented as an imperishable *Asswattha* plant which exists in inverted conditions with its roots above and branches below. It's leaves are compared with the Vedas (knowledge source of humanity) and roots point to the primeval being (God).

The divine love for the phytodiversity is expressed as follows in Gita (9/26).

“To me, any offer,
with love a leaf, flower,
a fruit or little water.

The pious offering with purity of heart,
delightful devotion pleasantly I do accept”.

(Padhy 2020)

One can mark, God does not want our costly offerings, but only a plant part or little water if it is offered purely and devoutly, with love. This is the importance of phytodiversity that is expressed by SriKrishna.

INDIAN RESEARCH: PAST CENTURY

When we walk in a narrow foot path, knowingly or unknowingly we crush over the small herbs and grasses; either with an intention or non-intention pluck flowers, fruits and cut off branches of the plants in our own garden or anywhere else, as well as root out the plants and spoil them as we like. We at times misbehave the plants around us. On the other hand we love them, take care, save them from diseases, maintain them with protection and bring up them as our own children. It is a fact that, most of us are not aware that, plants are conscious of our behavior. We have a common feeling that plants are silent spectators, grow with the direction of the nature, produce flowers and fruits and finally die. This thought of the whole world was changed for the first time by Sir Jagadish Chandra Bose, a world renowned Indian Scientist, who commenced special type of research on plants being encouraged by the depictions of ancient Indian literature.

Dr. J.C. Bose was a Professor of Physics at Calcutta's Presidency College, reputedly the best in India. Throughout his working life, 1894 to 1928 he uninterruptedly continued his research to prove that, plants have lively feelings like animals. He carried out all his work with minute instruments designed by self. To establish the result of his research, he proved all his experiments before the Royal Society of

England, that astonished the Scientist of the western world. All his research results are reflected in a series of books published by New York: Longmans, Green & Co. during the period 1902 to 1929 (Bose 1902, 1906, 1913, 1923, 1924, 1926, 1927, 1928, 1929). These books are now also regarded as factual and widely honoured in the scientific society. In America, the most significant scientific journal *Scientific American* wrote: what is the tale of the Aladdin and his wonderful lamp compared to the possibilities of Bose's Crescograph? In less than a quarter of an hour the action of fertilisers, food, electric currents and various stimulants (on plants) can be fully determined". Bose's Crescograph was so extremely sensitive that, was able to detect variation of the growth rate of a plant as hyperminimal as 1/1500 millionths of an inch per second.

The world famous scientific journal *Nature* commented: "Bose, a genius half a century ahead of his time". Some of the important features of the Bose's research are reflected as follows:

He designed a special optical lever with which he was able to demonstrate visually that all the characteristics of the responses exhibited by animal tissue were also found in those of plants.

The skins of different animals as well of fruits and vegetables behave similarly.

The activity inside the vegetal digestive organs in insectivorous plants is analogous to animal stomachs.

There is close similarity between the response to light in leaves and in the retinas of animal eyes.

The plants also become as fatigued by continuous stimulation as animal muscles.

The *Desmodium gyrans* (Family-Fabaceae) is commonly known as The Telegraph plant which has two small lateral leaflets, show movements perceivable with the naked eye. It is also known as the 'Dancing plant'. This plant is later renamed as *Codariocalyx motorius*. Bose found that the poison which could stop the automatic ceaseless pulsation of this plant would also stop an animal heart and antidote for this poison could bring both organisms back to life and movement.

It was observed that, when the leaflets of the telegraph plant are detached and the cut end of the leaflets were dipped in water in a bent glass tube, they recovered from the shock of its amputation and began to pulsate again. It is like an excised animal heart which can be kept beating in Ringer's solution. As the heart stops when blood pressure

is lowered and starts again when pressure is raised, similarly the pulsation of *Desmodium* behaved when the sap pressure was increased or decreased.

Plants respond to chloroform. Bose applied tranquilizer chloroform to a huge pine tree, uprooted and transplanted it without any fatal shock.

Mimosa Pudica (F. Mimosaceae) is known as a sensitive plant (*Lajju Lataa*: Shameplant) which closes its leaflets on touching. In a plant the leaflets are symmetrically arranged on each leaf with several leaves stemming from more or less same point. When the plant was touched at the tip of a leaf with a hot object, first the leaflets closed and then the base segment drooped. Bose interpreted these actions are due to electrical excitation, which in term, produced mechanical responses. A similar activity what happens in the animal nerve-muscle unit. A sort of reflex action can be marked in this plant. Suppose the tip of one leaf of a three-leaf petiole is touched, the leaflets of the disturbed leaf are gradually closed from tip to the bottom; then the petiole collapsed. After that in the other two leaves, the leaflets closed from the base to upwards, a product of reflex action.

Interestingly, plants become intoxicated like human beings reacting with whiskey or gin and after revival showed the signs of hangover.

When temperature tolerance of plants was tested, many met their end at sixty degrees Centigrade. But individual plants exhibited variations depending on their previous histories and ages. If the power of resistance of the plants was depressed by any artificial treatment by fatigue or poison, they approached death at temperatures as low as twenty-three degrees Centigrade. At death every plant used to throw off a huge electrical force. On the contrary plants absorb energy from the surrounding during their movement, ascent of sap and growth which they conserved in latent form for future use.

Bose found that, growth in some plants could be retarded and even halted by merely touching them, and that in others rough handling stimulated their growth. All the above interesting observations of Bose are reflected in his books published during the period 1902-1929 along with the experimental proceedings. He was knighted in 1917 and elected as the Fellow of the Royal Society in 1920 for his amazing contributions and achievements. He died aged 78, on 23 November in 1937.

In 1950 there was a Professor Dr. T.C. Singh, Head of the Department of Botany at Annamalai University of Madras (Tamil Nadu), India. He was interested to study the effect of music on plant life (Singh 1962-1963), being prompted by the *Puranic* stories of Lord SriKrishna, whose flute music enthralled the growth of verdure in Vrindavan.

In a preliminary study Singh observed that, the streaming of protoplasm in *Hydrilla* was accelerated by the vibration of an electrically operated tuning fork kept six feet away from the plant. Same response of the protoplasm was also recorded to the notes of a violin. Singh discovered that, the number of Stomata per unit area in the experimental plant *Mimosas* (an Australian *Acacia* tree) enhanced 66 percent when the South Indian tune '*Maya-malava-gaula raga*' was played before it daily for sometime for a fortnight. Even the thickness of epidermal walls and length of palisade cells increased 50 percent compared to control plants as per microscopic observations.

In a further experimentation, when a *raga* (tune) '*Kara-hara-priya*' was played with a *Veena* for twenty-five minutes every day before Balsam plants, they nicely responded to the music. During the fifth week, the experimental Balsams began to shoot ahead and produced an average of 72 percent more leaves than the control plants. Singh experimented the effect of music on many other plants such as common Asters, Petunias, Cosmos and white Spider lilies. Even economic plants like Onions, Sesame, Radishes, sweet Potatoes and Tapioca also nicely responded to music.

In an interesting experiment, Singh applied different *ragas* for several weeks half an hour daily played before sunrise with different instruments in low and high pitches and studied their affect. He concluded that harmonic sound waves has better effect on the growth, flowering, fruiting and seed-yields of experimental plants compared to music of flute, violin and *Veena*.

During the period 1960-1963 Singh played '*Charukasi raga*' on a gramophone via a loudspeaker before six varieties of rice growing in the fields of seven villages located in the State of Madras and in Pondicherry. He got 25 to 60 percent higher yield compared to regional average. He also got good results by provoking peanuts and chewing tobacco musically, with a high yield of 50 percent.

'*Bharata-Natyam*' is India's one of the ancient dance styles. When the girls danced before the plants without musical accompaniment and trinkets on their ankles, they caused to flower fortnight earlier than controls. This experiment was carried out on Aster plants, Marigolds and Petunias. It was presumed that, the rhythm of the footwork of the dancing girls transmitted through the earth, excited the experimental plants. Singh also demonstrated that, the fundamental metabolic processes of plants in relation to transpiration and carbon assimilation were accelerated upto 200 percent compared to controls under musical excitation.

All these Indian research on the sensitivity and expression of the plants by Bose and Singh, confirmed the consciousness nature of phytodiversity as reflected in ancient literature. This communication may be insufficient to elaborate the work of the above two great Indian scientists, those who had devoted their whole life to understand the feeling and expression of plants.

LAST LINES

Unlike the Vedic age concept, the ancient Greek Philosopher and Scientist Aristotle (384 B.C. to 322 B.C.) had the idea that, 'plants have souls but no sensation'. The theory lasted through the middle ages upto Eighteenth Century. Carl Linnaeus (1707-1778) the Swedish Botanist, Zoologist and physician who formalized binomial nomenclature and known as 'father of modern taxonomy', declared that, plants differ from animals and humans only in their lack of movement. Nineteenth century, the great naturalist Charles Darwin (1809-1882) proved that every plant tendril has its power of independent movement and they acquire and display this power only when it is of some advantage to them. At the beginning of twentieth century the Viennese biologist Raoul Heinrich France (1874-1943) put forth his view that, 'plants move their bodies as freely, easily and gracefully as the most skilled animals or humans, and that the only reason we don't appreciate the fact is that, they do so at a much slower pace than humans. All these slow growth of the concepts about the plant consciousness and feeling from Aristotle to twentieth century, suddenly and accidentally took a remarkable scientific step and discovery in the years 1960s. The facts are briefly presented as follows:

Events behind the Discovery

In 1966, in USA at New York's Times Square, Cleve Backster the topmost lie-detector of America had his office where he used to teach the art of lie detection to policeman and security agents from around the world. In this process a galvanometer, a part of polygraph lie detector is attached to a human being by wires through which a weak current of electricity is allowed to run. In response to mental images or slightest jerk of human emotions, the needle of the galvanometer used to move and a pen attached in the system marked a tracing on a moving graph of paper.

Coincidentally there was a house plant called *Dracaena massangaena* in Backster's office as a decorative item. One day Backster out of impulse attached the electrodes of one of his lie detectors to the leaf of *Dracaena* plant. He poured water on its roots and wanted to see if the leaf would be affected by water poured. Interestingly the polygraph lie detector expressed graphs similar to a human being experiencing an emotional stimulus for a short time. The question raised in his mind; is the plant displaying emotion. To confirm his feelings, he dipped the leaf of *Dracaena* in the cup of hot coffee in his hand. There was no reaction. To have more reactions of the plant, he planned to burn its leaf. The moment this thought raised in his mind, dramatically the tracing pattern on the graph is changed which raised a question: "could the plant have been reading the mind".

When Backster returned to the plant with a matchbox, he found another sudden movement was registered in the graph. He reluctantly burned the leaf and found that there was poor reaction almost. Backster came to a preliminary conclusion that, 'plants can think and are able to differentiate between real and pretended intention'. Avoiding publicity of his work, he concentrated on more and more experiments and scientifically established the emotional reactions of plants known as 'Backster effect'. All his work was published in the *Journal of Parapsychology* (Backster 1968) and more than seven thousand scientist asked for the reprints of this report at that time. A gist of all his work is as follows:-

In the Nature every living being has primary perception. The five senses of human beings might be limiting factors over dying the primary perception. May be plants are better without eyes than humans.

The plants react not only to threats of human beings, but also sudden appearance of unwanted entrance of animals cause them reaction. Even they react to a person who does not like them.

Plants are conscious and reactive for the suffering and death of other plants, animals, micro-organisms around their environment.

Under normal circumstances plants are attune with other plants. But when they encounter with any animal life, they tend to pay less attention to another plant nearby.

A plant expects that no other plant should cause it any trouble.

When plants are threatened with more danger or damage they express self-defensively and enter into deep faint condition.

A plant or its vegetable parts appreciate to become a part of another life form rather than rotting on the ground.

A plant do not appreciate if its owner speaks lie or gives false answer to any question.

A plant could remember and recognize the source of severe harm to its fellow.

The bond of affinity created between a plant and its keeper remains unaffected by distance. Plants read to their keeper from any distance room. Once a plant attuned to a particular person, it maintains a link with him, no matter he moves, even among thousands of people.

Any discussion about a project and its expected results generated by their conversations affected the plants three rooms away from the discussion point. Even death of lively cells by an automatic mechanism caused reaction in the plants in absence of any human being in the surrounding.

All the above Backster's findings can be summed upon a single concept of Vedic age that, plants has equal rights and privileges as other living species. They possess internal consciousness and experience pleasure and pain. Backster's findings encouraged other works to work on various parapsychological aspects of plants and they had also positive findings (Tampkins and Bird 1973).

The great Indian saint SriKrishna Chaitanya Mahaprabhu (1486-1534) had composed a nice Sanskrit hymn which focus on the concept that, 'the art of God realization should be learnt from plants, as follows (Padhy 1999).

*Trunaadapi suneechena
tarorapi sahishnuna;
amaainaa maanadena
keertaneeyah sadaa Hari.*

Meaning: Be humble like a grass (we never bother about the existence of grasses in a footpath), tolerant as a tree (The big tree provides shade to the cutter of its trunk); free from ego (Plants have no self-esteem), respect to all (Plants never disrespect to any one), always sing, the glory of Hari (divinity), with all these qualities of a plant.

ACKNOWLEDGEMENT

This work is dedicated to our Alma Matter- The Postgraduate Department of Botany, Berhampur University, Brahmapur 760 007, Odisha, India on the occasion of its Golden Jubilee Celebration on 2020. We were humble students of the first batch; remember our Dear and Honourable Teachers Prof. H. Pattnaik, Prof. P.C. Tripathy, Prof. P.A. Khan and Prof. U.C. Biswal, our batch mates and other non-teaching staff.

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Paper received for publication in June, 2020
 Paper accepted for publication in June, 2020