

THE EFFECT OF MUSIC ON PLANT GROWTH

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ABSTRACT

Plants are living organisms that breathe and grow. They are able to feel and respond to vibrations and frequencies. Music is known to have a profound effect on humans and other animal species, it is beneficial for plant life also. Plant Growth is a process which result in increase of number and size of leaves and stems. It also results in strengthening of roots and production of blossoms. There are different opinions about the effect of music on plants. They can grow better at certain frequencies and their growth is stunted at certain frequencies. Many scientific researches have proved that there is remarkable effect of music therapy on plants. It can be concluded from the study that music promotes the growth and development of plants, and specific audible frequencies and musical frequencies also facilitate better physiological processes like absorption of nutrients, photosynthesis, protein synthesis, etc. For plant and this is observable in terms of increased height, higher number of leaves and overall more developed and healthier plants.

Key words : Music, Plant growth, Agriculture, Music therapy.

INTRODUCTION

Plants are living organisms that breathe and grow. They are also able to feel and respond to vibrations and frequencies. Music is known to have a significant effect on humans and other animal species, it is beneficial for plant life also. Plant Growth is a process which result in increase of number and size of leaves and stems. It also results in strengthening of roots and production of blossoms. Some scientists are of the opinion that plants are devoid of a nervous system and therefore are unable to understand music or respond to music. However, there are a few studies conducted which suggest that music may have distinct effect on plants (Chowdhury & Gupta, 2015). Music is a harmonious and coherent blend of various frequencies and vibrations and has many different forms, qualities and pitches. It is found that loud and unharmonious sounds can ruin the mood and health of a plant and blossoms and on the other hand soft rhythmic music is better for their growth and overall health. In general, sound is transmitted in the form of waves that travel through a medium, such as air or water. The waves cause the particles in this medium to vibrate that further causes eardrum to vibrate. This pressure energy is converted into electrical energy for the brain to translate into what we understand as musical sounds. Several studies have demonstrated that musical sounds have a significant effect on the quantity of seeds sprouted contrasted with the untreated control and sound vibrations also influence the biological systems (Creath & Schwart, 2004).

OBJECTIVES

The main objective of this study is to know and collect the previous scientific researches and scientific facts behind the effect of music on plants and to find the effects of music on plant growth and use of musical therapy in agricultural field.

SCIENTIFIC RESEARCHES / SCIENTIFIC FACTS

There are several researches and experiments done on the effect of Music therapy on plants. In 1962, Dr. T.C. Singh, head of the Botany Department at Annamalai University experimented with the effect of musical sounds on the growth rate of plants. He found that balsam plant grew at a rate that accelerated by 20% in height and 72 % in biomass when exposed to music. He initially experimented with classical music. Later he experimented with raga (improvisations on a set of rhythms and notes) played on flute, violin, harmonium. He found similar effects. Sir Jagdish Chandra Bose, plant physiologist and physicist, spent a lifetime researching and studying the various environmental responses of plants. He concluded that that they react to the attitude with which they are nurtured. He also found that plants are sensitive to factors in the external environment, such as light, cold, heat, and noise. Bose documented his research in Responses in 'The Living and Non -Living', published in 1902, and 'The Nervous Mechanism in Plants', published in 1926. In order to conduct his experiments he created recorders capable of detecting extremely small movements, like the quivering of injured plants, and he also invented the crescograph, a tool that measures the growth of plants. From his analysis of the effect of specific circumstances had on plants' cell membranes, he hypothesised that they could both feel pain and understand affection. (Mazlana, 2021) Luther Burbank, an American botanist and horticulturist, studied how plants react when removed from their natural habitat. He talked to his plants. His studies were inspired by the work of Charles Darwin's 'The Variations of Animals and Plants under Domestication', published in 1868 (Mazlana, 2021). The work of Reddy et al., 2013 showed that Indian classical ragas have a positive impact on overall plant protein production on plants like wheat, spinach, horse gram, music not only accelerates growth but also significantly influences the various metabolites concentrations e.g. Chlorophyll and starch levels are increased by it. Experiments by Chivukula and Ramaswamy, 2014 showed that soothing vibrations in the form of vedic chants and Indian classical music increased growth in Rose (*Rosa chinensis*) where as rock music stunted growth. Zhu and co-workers in 2014 observed that IAA content in plants were found at an increase level in six species of vegetable plants when exposed to musical acoustic frequencies in comparison to control plants. Yi and colleagues in 2003 reported that sound stimulation increased the metabolism of roots and hence the growth of

Chrysanthemum. Hou et al., 1994 measured the emissions from the Phylodendron leaves and found that they produced a frequency of 50 Hz to 120 Hz. They also observed that these leaves accepted external stimulus of frequency lower than 150 Hz and showed a good response in terms of better growth. Dorothy Retallack, 1973 conducted several experiments to observe the effect of music on different types of plants and found that music is a positive factor for growth. Classical music of specific frequency, Interval and rhythm accompanied with dynamically changing lyrics positively influenced root growth and mitotic divisions in Onion plant. It is also experimented that playing ancient traditional Indian chants besides the plants helps in intake of the vibrations and helps them grow faster and much better qualitatively (Patel et al, 2016).

Musical sounds influence plant growth in many ways. Some of them are:

- **Gene Activation:** Some specific sound frequencies activate certain genes to increase the growth of plant cells.
- **Sound Resonance:** Every object has its own resonant frequency and the resonance occurs when this frequency is played. The resonance occurs at molecular levels when the frequencies of music and plant cells match.
Effect on Stomata: The exchange of carbon dioxide and Oxygen between the environment and plant leads to growth. The air openings in the leaf cells called stomata stimulate such exchange. The music helps the stomata to remain wide open for an increased intake of foliage nutrients and water.
- **Effect on cell organelles:** The fluid move more rapidly and is intensely stirred around resonating objects. Certain frequencies create resonance in the cell organelles of living organisms by increasing the movement of cytoplasm within the cells which leads to the growth of cells
- **Movement of Protoplasm:** The living organisms are composed of protoplasm, which constantly moves. This movement is lowest at dawn and dusk. The sound vibrate the leaves and increase this movement which increases the growth of healthy plants by increasing the synthesis of food and nutrients (Sharma, 2021).

CONCLUSIONS

Different plants show different responses to music in different stages of growth. The increased rate of growth in terms of more flowers, leaves, buds etc. suggests that specific audible frequencies including music can benefit the agricultural sector by increasing the productivity. The use of music therapy on plants might reduce the

requirement of toxic chemical fertilizers and pesticides and therefore can reduce environmental pollution and facilitate the well-being of plants, animals and human beings. There is wide scope to carry out further research in this field where physicist, biologists and agriculture engineers can get actively involved to devise a scheme to nurture this green way of agriculture (Choudhary & Gupta 2015).

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