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STUDIES REGARDING THE INFLUENCE OF MUSIC ON THE WHEAT PLANTS GROWTH

Mihai Adrian RACHIERU, Irina IACOB, Maria CRISTEA

Scientific Coordinator: Assoc. Prof. PhD Alina ORTAN

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding authors email: iacobirina20@yahoo.com, cristea_maria21@yahoo.com

Abstract

The positive effect of music not only on humans, but also on animals and plants is well known for a long time, being used in music therapy. Studies have shown that a harmonious musical concert stimulates songbirds from forests. Moreover, monkeys, depending on the nature of music they listen to, could cheer or fall into melancholy. If music is a mean of relaxation or even healing for people, which is its effect on plants? The current paper aims at answering this question, by presenting the results of an experiment that studied the biological effects of different genres of music on the wheat plants growth. The Triticumaestivum seeds were placed into three pots and the humidity, temperature and damping program were kept constant. One of the pot was set as the control group, the other two being subjected to the following musical compositions: Havasi - Rise of the instruments and Led Zeppelin's tracks for 2 and a half hours a day. The experiment lasted 6 weeks, during which plants height was measured weekly and change in leaves color was visually estimated. The obtained results were in accordance with the literature data: both classical and rock music affect living biological systems, those exposed to classical music being higher and brighter than either the control group or those exposed to rock music.

Key words*: wheat, growth, classical music, rock music.*

INTRODUCTION

The positive effect of music not only on humans, but also on animals and plants is well known for a long time, being used in music therapy. Studies have shown that, being multicellular organisms (Benford, 2002; Dossey, 2001; Kristen, 1997), they react to sound vibrations even in the seed stage (Braam and Davis, 1990). In a study conducted on plants exposed to different styles on music, O'Donnell et all showed that plants growth was influenced in a negative way by the rock and acid rock music (O'Donnell et all, 2009). In their experiment, Popescu and Mocanu demonstrated that the treatment with folk music from pipe flute determined an increase in salad yield by 12.8 - 19.8% (Popescu and Mocanu, 2013).

Researchers from Canada and the former Soviet Union found that wheat will grow faster when exposed to special ultrasonic and musical sounds. They estimated the effects of music on plant growth using different genres including classical, rock, acid rock, and East Indian music. They found that the plants grew well for almost every type of music except rock and acid rock.

Another experiment was based on insect music and they demonstrated that after different acoustic frequency treatment, in besides soybean plant height,dry root weight of cabbage and greengrocerythere was significant difference of plant height,fresh weight and dry weight between the other vegetables and control groups.

The current paper aims at presenting the results of an experiment that studied the biological effects of different genres of music on the wheat plants growth.

MATERIALS AND METHODS

The Triticumaestivum seeds were placed into three pots. The pots were filled with peat without any kind of fertilizer (Figure 1).

One of the pots was set as the control group, the other two being subjected to music. After studying the literature data, the following musical compositions were chosen: Havasi -

Rise of the instruments and Led Zeppelin's tracks; the music was played for 2 and a half hours a day for the whole period of the experiment. The humidity, temperature and damping program were kept constant. Thus, water was used as a damping agent, and the watering program was as follows: 3 times a week in first two weeks, then 3 times a week for the next 2 weeks and once a week for the last 2 weeks. Humidity recorded and maintained constant throughout the experiment was 40%.The temperature for the three potswas kept constant as well, respectively 24 degrees Celsius, which is the optimal temperature for wheat growth. The plants have benefited from natural light.

Figure 1. *Triticumaestivum* seeds planted in peat

In order to recognize the pots, they we noted by letters: B was the control group, A was the pot with plants subjected to classical music and C was the pot with plants listening to rock music.
The experiment lasted 6 weeks, during which plants height was measured weekly and change in leaves color was visually estimated.

RESULTS AND DISCUSSIONS

As it was mentioned above, the height of the plants were measured and also the color was vissualy estimated. For comparison, figures 2, 3 and 4 show the differences in height registered for pot A during the experiment. The measurements made after the first week showed tha the growth was differentiated even from the beginning: 3 cm for the clasical music (pot A), 2 cm for the control group (pot B) and only 1 cm for the plants subjected to rock music (pot C).In terms of color, it could be observed even from this stage a differentiation: the color for plants in pot A was bright green, while the one for pot C was yellowish green.

Figure 2. Image with Triticum aestivum in pot A after first week

In second week we could notice more significant differences in plants' growth and colour.
After the third measurment we could find that plants' growth was much more aggressive, and this rate was held in the fourth week as well (for example, after third week plants subjected to clasical music had 14 cm in height, the control grup 10 cm, and the plants subjected to rock music only 6 cm in height).
According to fifth measurement it could be observed thatthe plants were changing their growth rate, some of them keeping the aggressively rythm, some of them decreasing it (plants in pot A and B decreased their growth rate, while plants in pot C maintained it constant). In turn, the color of plants began to differentiate more. From this point we could notice a difference in color also between the plants in the control group and the plants subjected to classical music.

The last measurement (sixth week) showed that the growth rate was constant dor all of the three groups.

Figure 3. Image with Triticum aestivum in pot A after third week

Figure 4. Image with Triticum aestivum in pot A after fifth week

The results obtained in this experiment are mostly in accordance with literature data: after 6 weeks, the plants subjected to clasical music had 20 cm in height, the control grup 14 cm, and the plants that listened to rock music had a height of only 10 cm. Figure 5 shows the different dimensions of the plants of all 3 pots during the experiment.

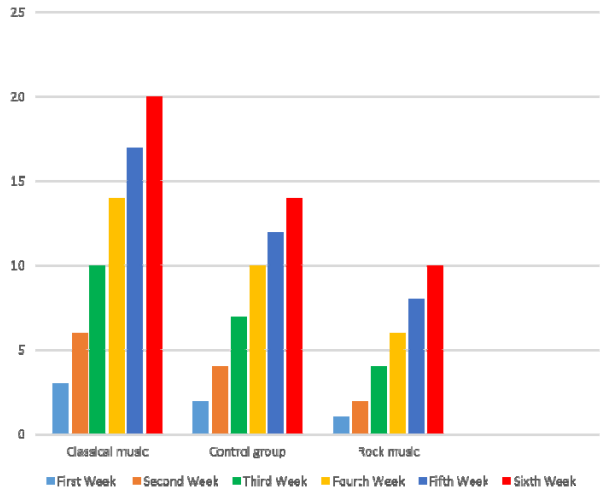

Figure 5. Evolution of Plantsgrowth during the 6 weeks of experiment

As it could be noticed from the figure, the plants subjected to classical music (pot A) had the most significant growth, while the one subjected to rock music had the lowest growth rate.

The experiment showed that the average growth for the plants subjected to classical music was 3.33 cm per week, 2.33 cm per week for plants from the control group and in the case of plants subjected to rock music the average growth rate was 1.33 cm per week.

Regarding the color, the plants' color at the end of this experiment presented also significant differences, from bright green at the plants exposed to classical music to yellowish green for plants subjected to rock music.

What was unexpected was the fact that wheat from pot C didn't present any injuries. According to specialty literature, the plants subjected to rock music often develop some lesions, which were not present in our experimental group. The only differences were in plants height and colour.

Recent studies based on physics and molecular biology research provide much more accurate information on the sensitivity of plants to music. According to Neacsu , the amino acids,

under the influence of sound waves, are organized into proteins through a suite of resonance phenomena; when plants listen to "favorite song," acoustic waves are transformed into electromagnetic waves, producing the protein of this song (Neacsu , 2010). Therefor, we can affirm that there is a link between protein and music, and music can ease the synthesis of proteins useful to the body.

CONCLUSIONS

Our study confirmed what was found in studied literature: plants are dainty and cannot agree with every type of music. They develop easier and grow faster only on slow rhythms, especially played by instruments made of natural elements like violin, piano, cello.

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