

Morphological, Phenological, and Yield Assessment of Cosmic Yantras on *Solanum lycopersicum* L. and *Pisum sativum* L. Crop Plants Under Normal Climatic Conditions

Chand Kiran¹, Prachi¹, Sunita Devi¹, Gulshan Kumar^{2*}, Shriya³, Nitesh Kumar⁴

Abstract

Vegetables are edible plants or parts of plants (roots, stems, leaves, flowers and seeds) that are consumed for their nutritional value. They are rich in vitamins, fiber and antioxidants. The study was conducted in cropping season (April to October 2024) to observe the comparative effect of cosmic yantras and organic manures on growth and morphology of *Pisum sativum* and *Solanum lycopersicum* under normal climatic conditions. The objective of this research was to study the impact of organic fertilizer and cosmic yantras on tomato and pea plant growth and yield potential. Out of 30 pots used in this study, 15 were for *Pisum sativum* and 15 for *Solanum lycopersicum*. In each set of 15 pots, we used three different conditions, 5 pots with normal soil and cosmic yantras, 5 pots with organic fertilizers mixed with soil and 5 pots with normal soil. After thorough evaluation of the experimental pots, it was found the application of cosmic yantras demonstrated the superior performance as compared to the organic fertilizer. *P. sativum* and *S. lycopersicum* exhibited higher yield and improved plant vigor with the application of cosmic yantras, as confirmed by the recorded data. The result obtained the relevance of optimizing higher nutrient and management practices in cosmic yantra with no effect to the environment. It enhanced yield potential and promotes sustainable agricultural practices for future food security.

Keywords: Cosmic yantras, growth hormone, *Pisum sativum*, *Solanum lycopersicum*, Phenological

INTRODUCTION

Indian agriculture is major economic sector in India that involves the cultivation of crops, livestock

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farming and the production of various agricultural products. Organic farming is getting worldwide attention because it helps to diminish harmful effects of chemical fertilizers and pesticides in environment [1]. Intensified farming has led to the overuse of pesticides and chemical manures. It harms the soil by damaging beneficial organisms, lowers the quality of the crops, and poses risks to human health. Additionally, it creates a heavy financial burden on farmers due to the constant need for these chemicals. Traditional agriculture is a farming method that has been practiced for centuries, typically using low-tech tools and techniques passed down through generations. Traditional agriculture is often seen as a bridge between hunting and gathering, which provides enough food for survival, whereas modern agriculture focuses on large-scale food production

for global markets. There has been growing interest in documenting traditional knowledge because of its importance in creating a sustainable environment and managing resources effectively. Crop diversification is an agricultural practice of cultivating a variety of crops in a given area instead of relying on an easy access to chemical fertilizers and pesticides single crop. In the 20th century, agricultural practices became more focused on increasing productivity, leading to a significant intensification of agroecosystems [2]. These shifting patterns lead to sharp decline in the number of plant species being cultivated [3]. Special fertilizers can be used as a source of nutrients, following plant growth regulators, pesticides, and herbicides, to boost crop productivity [4]. These intensive farming practices have not only made agricultural systems more uniform but have also caused agriculture to become a major factor in pushing past several planetary boundaries [5]. Several alternative agricultural systems have been suggested as more sustainable options to current intensive methods. These alternatives aim to provide enough food while reducing the environmental impact of food production [6]:

- *Organic Agriculture*: A method, used to evade synthetic chemicals like fertilizers and pesticides. Main objective of using this agricultural practice is to use the natural products prepared by natural processes to maintain the soil health and enhance the plant growth and productivity without any harmful effect on the climate.
- *Agroecological Farming*: This approach blends farming with ecological principles, aiming to work with nature. It emphasizes biodiversity, reducing the use of chemical inputs, and promoting practices like crop rotation and organic fertilizers.
- *Ecological or Sustainable Intensification*: This method aims to increase food production without causing harm to the environment. It uses smarter techniques, like improving soil health, efficient water use, and better crop management, to produce more food while protecting ecosystems [7].

These alternative farming systems aim to increase agrobiodiversity, which means growing a variety of different crops on farms and in the surrounding landscape. According to ecological theory, having more diverse systems can provide more benefits like better pest control, healthier soils, and improved pollination. Plus, these benefits are more stable and reliable over time compared to less diverse farming systems. In simple terms, the greater the variety of crops, the better the environment and farming system can perform [8]. The factor which reduced the diversity of cropping systems. These are including in which encourage the focus on a few high-yielding crops rather than a variety of crops [9]. These processes have led to greater genetic uniformity within crop species. Because farmers focus on a few high-yielding varieties, there is less genetic diversity, making crops more like each other and reducing the variety of genes in the population [10]. Fewer crop species are being used in rotation [11]. Agricultural landscapes have become more uniform, with large fields of the same crop, reducing variety in both the crops grown and the overall landscape. This often leads to less biodiversity [12]. In hilly or mountainous areas, cash crops are often grown because they can be more profitable than traditional food crops. These areas might be used for crops like pea and tomato.

A Pea is a small, rounded, edible seed obtained from *Pisum sativum*. It belongs to the legume family Fabaceae. Pea is a diploid legume with a large genome [13]. Low soil fertility is one of the biggest challenges to improving agricultural production [14]. Fertilizer and plant nutrition researchers should find a balance between using fertilizers to help crops grow and protecting the environment [15]. Legumes play a unique role in the environment because they can “fix” nitrogen from the air [16]. Peas are mainly grown as food for humans and are one of the most important crops for our diet [17]. Cow dung, a well-known example of organic fertilizer is environment friendly. Organic fertilizers are cost effective and most commonly used in replacement of chemical fertilizers [18].

The pea is an annual legume from the family to Fabaceae, originally from Southwest Asia. It is one of the four most cultivated legumes, alongside soybean, groundnut, and beans [19]. Peas are an important vegetable grown worldwide. It is believed to be originated in Ethiopia, Europe, and Asia. In India, pea is majorly grown as a cool-season crop in the plains of North India and as a summer

vegetable in the hill [20]. As a cool-season crop, peas help improve the yield and protein content of the next cereal crop in rotation by boosting the nitrogen levels in the soil [21]. The nutritional and functional properties of pea protein depend on two key factors. The more protein there is in pea protein, the higher its nutritional value. This means it provides more of the essential amino acids which are required by our body to build muscles, tissue repair, and improve overall health. The quality refers to how well the amino acids in pea protein match those in the human body. A high-quality protein has a balanced profile of essential amino acids that can be easily used by the body. So, pea protein to be most effective, it needs to have a good amount of protein (quantity) and be rich in the right amino acids (quality). This will determine how well it functions in supporting muscle growth, providing energy, and other health benefits [22].

Pea also has health benefits such as lowering blood pressure, serum cholesterol, balancing blood sugar, and reducing the risk of certain cancers [23]. Peas are grown and consumed widely as food for both humans and animals. Forage peas are commonly grown for hay, pasture, or silage, either alone or mixed with cereals. The main goal is to create a balance between the soil, plants, animals, and humans, all of which are connected [24]. The choice of suitable fertilizers for plant growth depends on local conditions, such as the type of soil and climate, which can vary from one place to another [25].

Numerous tests and experiences have shown that farmyard manure, with its long-lasting nutrients, is an ideal fertilizer for promoting crop growth [26]. Cosmic yantras is a catch waves which have cosmic rays and convert it into plant growth hormone. Cosmic rays are known to be the high energy particles which travel through the universe nearly by the speed of light. These particles include electrons, protons and atomic nuclei which can reach Earth and interact with the atmosphere, sometimes causing radiation. They are called cosmic because they originate from space outside our planet. The Galaxy needs a continuous energy source of about 10³⁴ watts to sustain cosmic rays. This is a large amount of power, and understanding where this energy comes from is key to studying the origin and behavior of cosmic rays [27].

Cosmic yantras are geometric diagrams used in Hinduism and other spiritual traditions to represent various divine principles, cosmic forces, or deities. Thus, a yantra is essentially a symbolic tool for focusing spiritual energy and meditation. Positive and negative vibes associated with cosmic yantras are:

- *Positive Vibes of Cosmic Yantras:* Yantras facilitate a deep connection with the divine, encouraging, meditation and inner peace. Yantras are often used as protective, symbols, warding off negative influences or energies from the environment.
- *Negative Vibes of Cosmic Yantras:* Placing a yantra in an inappropriate location (facing the wrong direction or in a cluttered space) may disrupt its intended energy flow. Tomato is an important fruit crop of globe, ranking second after potato in many countries [28]. It belongs to family solanaceae and genus *Lycopersicon*. *Lycopersicon* species is native to Ecuador, Peru, and the Galapagos Islands, most suggestion recommends that tomatoes were domesticated in Mexico [29]. Tomatoes were introduced to West Africa, specifically Nigeria, at the end of the 19th century [30].

A tomato is a fruit that is commonly treated as a vegetable in culinary contexts. It is scientifically classified as a berry because it develops from the ovary of a flower and contains seeds. Scientific name of tomato is *Solanum lycopersicum*. Tomatoes belong to the Solanaceae family. Tomatoes are a major crop, with global production estimated at over 120 million metric tons [31]. Tomato is one of the most important and popular fruit vegetable in the world. The crop describing is a self-pollinated annual from the Solanaceae family, with a chromosome number $2n = 2x = 24$. The family Solanaceae has undergone a recent revision in its phylogenetic classification. The genus *Lycopersicon*, which traditionally included the tomato (*Lycopersicum*), has been reintegrated into the genus *Solanum* [32]. Tomatoes are an important part of the human diet because they provide essential vitamins and

minerals. Tomatoes are widely grown and important worldwide. They are rich in lycopene, a compound known for its antioxidant and cancer-fighting benefits [33].

Lycopene, the antioxidant that gives tomatoes and watermelons their red color helps protect against oxygen damage. Lycopene is believed to support and improve heart health and reduces the risk of cancer, especially prostate cancer. Tomato plant needs various nutrients, like nitrogen, phosphorus, potassium, magnesium, calcium, sodium, and sulphur, for better growth. Each nutrient has a specific role, and it's important to provide them in the right amount and at the right time for the plants to grow well [34]. Over 80% of the tomatoes grown worldwide to produce various products such as sauce, juice, ketchup, stew, and soup [35].

Tomatoes are widely believed to have originated in the Andean region of the New World. This area includes parts of Bolivia, Chile, Colombia, Ecuador, and Peru [36]. Evidence from the variety of cultivated tomatoes suggests that tomatoes were originally domesticated in Mexico (Jenkins et al., 1948). After the discovery of the New World, the tomato was brought to Europe and gradually spread to other parts of the world [37]. Tomato is an important vegetable grown worldwide. In the 20th century, tomatoes became more popular and companies started making F1 hybrid seeds [38]. Today, the tomato is a central crop in the horticultural industry and is grown worldwide, both for the fresh market and for processing [39]. Tomatoes contain lycopene, which can help protect our cells from cancer [40]. Lycopene is also the pigment mainly responsible for the red color of tomato fruits. Studies have shown that the amount of lycopene in tomatoes is mainly affected by factors like the type of tomato variety, the growing season, environmental conditions, and when the tomatoes are harvested [41].

In 2013, tomatoes ranked 7th in global production, with around 164 million tonnes harvested from nearly 4.8 million hectares of land [42]. Tomato is an important vegetable grown and consumed all over the world. This can result in the buildup of heavy metals in plant tissues, which reduces the nutritional value and quality of the fruit [43]. Tomatoes are essential for improving human diets. The fruit is used in many ways, either fresh in salads or as puree in gravies, stews, and soups, catering to the diverse food cultures worldwide. It is environmentally friendly, non-toxic, requires little energy to prepare, and is a recycled biological product [44]. Some studies have found that organically grown tomatoes have higher levels of antioxidants, Tomato is a widely cultivated perennial plant, commonly red, sometimes yellow, used as vegetables in throughout the world including Bangladesh. In Bangladesh, the area of cultivation is about 68366 acres with the production of about 388725 metric tons. The top tomato producing states of India are Andhra Pradesh, Madhya Pradesh, Karnataka, Telangana, Chhattisgarh, Haryana, Tamil Nadu, Uttar Pradesh and Maharashtra. These states account for about 90% of the country's total tomato production. There is an increasing interest in developing straight forward methods to boost the concentration of polyphenols in foods, aiming to enhance their overall nutritional value [45], total phenolics, and vitamin C [46].

The harmful effects of chemical fertilizers on soil and the environment restrict their use in sustainable farming systems [47]. Phenolic compounds are small molecules that contain at least one phenol unit in their structure. They can be classified into different types, including phenolic acids, flavonoids, tannins, coumarins, lignans, quinones, stilbens, and curcuminoids [48]. Tomatoes are affordable and rich in vitamins, minerals, and healthy organic acids [49]. They choose tomatoes over other vegetables because of its multiple harvests and high profit potential. To make a profit, farmers need good market sales and improved production efficiency through modern tools and techniques [50]. Integrated Farming System (IFS) is farming method which combines different farming activities, rather than focusing on just one crop (monoculture). Studies in various regions have shown that the integrated farming system approach not only increases overall productivity but also takes advantage of the synergies between different agricultural activities. This approach boosts total productivity, profitability, sustainability, and provides employment for farm households. In simpler terms, farming systems are strategies for managing resources effectively to achieve steady economic production,

meet the needs of farm families, and protect the environment [51]. Integrated Farming System is a connected mix of soil, water, plants, animals, and the environment, with their interactions making the system more profitable and viable compared to traditional farming. It helps produce high-quality food. To improve the food chain, it's important to address nutritional imbalances caused by a lack of minerals and vitamins in the food we eat. Including horticultural and vegetable crops in the farming system can produce 2–3 times more energy than cereal crops on the same land, helping to ensure better nutritional security. In this system, various farming activities are connected, and the waste or byproducts from one activity are used as inputs for another. This helps lower costs, increase production, and improve overall income [52].

Most fresh market tomatoes are grown by small-scale farmers. Several pieces of research conducted on organic and chemical-based farming have shown that organic farming generally results in higher soil organic matter and total nitrogen (N) levels [53]. Like sustainable agriculture, organic farming has many different definitions. Several studies have shown that organic farming can increase species biodiversity compared to non-organic farming, due to the greater complexity and quality of landscape features such as for birds [54]. Organic farming is both productive and sustainable [55]. Organic agriculture avoids synthetic fertilizers and pesticides, instead using organic fertilizers to provide nutrients for crops [56]. Organic farming helps restore and maintain soil fertility [57]. It helps reduce agriculture's negative impact on climate change [58]. Organic fertilizers contain important nutrients, like nitrogen, phosphorus, and potassium, as well as essential vitamins, growth hormones like indole acetic acid and gibberellic acid, and helpful microorganisms [59]. Organic manures are environmentally friendly, because they are obtained from organic sources [60]. Inorganic farming, also called conventional farming, uses fertilizers, chemicals, and pesticides to boost productivity, but it also increases environmental impact [61]. Using animal manure as organic fertilizer has become a key strategy in sustainable farming, especially in areas where the soil lacks natural nutrients. Organic fertilizer boosts the soil's physical and biological activity, but it has lower nutrient levels, so larger amounts are needed for plant growth [62]. In Ukraine, the lack of nitrogen in the soil is mainly due to a sharp drop in organic fertilizers, caused by a significant decrease in livestock numbers in the public sector. As a result, manure, a key traditional fertilizer, is used much less [63]. Thus, efforts to increase the quantity of nodule bacteria as well as the intensity and productivity of nitrogen fixation are highly pertinent [64]. Growing environmentally friendly crop products with less soil nutrient aggregation and, most importantly, nitrogen-containing compounds is becoming crucial at this point in the evolution of agricultural production [65]. Captive farming is a type of farming where animals are raised in controlled environments, typically for commercial purposes. This system involves keeping livestock in confined spaces, such as barns or pens, where their feeding, breeding, and overall care are carefully managed. Agroforestry is an age-old farming practice that can help address many environmental issues we face today and in the future. This was also highlighted in a study across Europe [66]. As agriculture develops, it's becoming increasingly important to grow eco-friendly crops that don't deplete the soil, especially when it comes to nitrogen-based compounds. Positive experiences and emotions, such as happiness and optimism, can reduce stress, anxiety, and depression, leading to better mental well-being. Negative experiences, emotions, and situations, like fear or sadness, can cause stress and anxiety, leading to mental health issues. Well-being is closely connected to optimism and belief in one's abilities. Negative emotions are valuable because they trigger specific actions [67]. Positive emotion makes feel and the balance between positive and negative emotions affects how we judge our life satisfaction [68]. Positive and negative effects both have a significant impact on human beings. Positive experiences and emotions, such as happiness and optimism, can reduce stress, anxiety, and depression, leading to better mental well-being. Negative experiences, emotions, and situations, like fear or sadness, can cause stress and anxiety, leading to mental health issues. Well-being is closely connected to optimism and belief in one's abilities. Research has shown that being optimistic is a strong predictor of different aspects of well-being, both positive and negative [69].

A vegetable crop with distinct biological and physical characteristics is the pea. A pea is an annual herbaceous crop grown for food. It is a crop that is cultivated throughout the chilly seasons all over the planet. Organized fertilizers supply most of the essential nutrient's plants need, boosting crop growth and yield. They also have positive lasting effects on future crops [70]. Peas, being a legume, help keep the soil fertile by fixing nitrogen through a partnership with Rhizobium bacteria in their root nodules. Cultivars suited for organic farming are often different from those for conventional systems, with the following characteristics being important [71]. Adding organic fertilizers to the soil quickly boosts the growth of soil microbes [72]. The pea (*Pisum sativum* L.), a member of the Fabaceae family, is a significant winter vegetable farmed in Iraq and is rated second economically [73]. In modern agricultural practices, especially when cultivating high-yield legume crops, like garden peas, a balanced and tailored nutrition program becomes essential [74]. Using organic fertilizer on the soil significantly increased the number of pods per plant, pod length, and seed yield of broad bean plants [75]. Organic fertilizers improve the physical and chemical properties of the soil and reduce the need for chemical fertilizers. This leads to better plant growth and higher yields [76]. Garden pea is of great significance for actual nutrition due to the balanced content of protein and carbohydrates, biologically active and mineral substances [54].

MATERIALS AND METHODS

The pots experiment was conducted in the cropping season to determine the growth and yield of *Solanum lycopersicum* and *Pisum sativum* in response to organic fertilizer and cosmic yantras. In the specific pots experiment we were founded that effect of cosmic yantras in tomato and pea plant was little high as compared with organic fertilizer also we determined that stages of its life cycle and development from seed germination to fruit ripening. These stages are crucial for effective crop management, optimizing yield and ensuring timely plant and harvesting.

- *Germination*: Seeds of tomato typically germinate in 5–10 days at optimal temperatures (20–300C). Seedling growth starts with the emergence of the first true leaves.
- *Vegetative Growth*: This phase includes the development of leaves, stem and roots. It is influenced by temperature, light and water availability. The plant will focus on building string foliage during this period.
- *Flowering*: Flowering begins when the plant reaches a sufficient size and is influenced by environmental factors, particularly day length and temperature. Flowers are usually produced 50–60 days after planting
- *Fruiting*: After successful pollination, the tomato plant enters the fruiting stage, where flowers develop into small green fruit. This process is influenced by both temperature and moisture, with ideal condition being warm and consistent.
- *Ripening*: As fruit mature, they change color from green to red, yellow, orange, depending on the variety. This stage is regulated by internal hormone and environmental factors like temperature, humidity, and light. The process usually takes around 40–50 days after flowering.
- *Harvesting*: The tomato is ready for harvest when it reaches its color and size. The ripening process can be accelerated under controlled conditions, and harvesting times can vary depending on the variety and growing method.

RESULTS

Yield Aspects of *Solanum lycopersicum* L.

It focusses on factors influencing the quality and quantity of tomatoes produced per unit area. Understanding these aspects is critical for optimizing cultivation practices and achieving higher productivity. Tomato yield depends on genetic, environment and management factors.

Some phenological parameter used to study Tomato plant [2].

- *Germinating Percentage*: (number of tomato plants ÷ total number of tomato plants × 100).
- *For cosmic yantras*: The germinating percentage of tomato was recorded in 10 days with 86%

$$\left(\frac{13}{15} \times 100 = 86\%\right)$$

- *For Organic Fertilizer*: The germinating percentage of tomato was recorded in 15 days with $80\% \left(\frac{12}{15} \times 100 = 80\% \right)$.

Days to Germination

- *For Cosmic Yantras*: The day to germination of tomato was recorded in 20 days.
 - *For Organic Fertilizer*: The day to germination of tomato was recorded in 23 days.
- Estimated germination time for common seed is:

Vegetables

- *Carrot*: 10–21 days.
- *Lettuce*: 7–10 days.

Seedling Emergence

- *For Cosmic Yantras*: Seedling emergence of tomato was recorded in 15 days.
- *For Organic Fertilizer*: Seedling emergence of tomato was recorded in 17 days.

Day to Flowering

- *For Cosmic Yantras*: Day to flowering of tomato was recorded in 20–25 days.
- *For Organic Fertilizer*: Day to flowering of tomato was recorded in 30 days.

Flower and Fruit Set

- Flower Set (%) = (Trusses with flowers / Total trusses) $\times 100$.
- Fruit Set (%) = (Number of fruits / Number of flowers) $\times 100$.
- *For Cosmic Yantras*: Flower Set = $(15/20) \times 100 = 75\%$ and Fruit Set = $(9/15) \times 100 = 60\%$.
- *For Organic Fertilizer*: Flower Set = $(13/18) \times 100 = 72.2\%$ and Fruit Set = $(7/13) \times 100 = 54\%$.

Fruit Growth

- Fruit growth = Final weight X_2 – Initial weight X_1 / Time (Days).
- *For Cosmic Yantras*: $40 - 16 / 11 = 24 / 11 = 2.18$ grams per day.
- *For Organic Fertilizer*: $35 - 13 / 11 = 22 / 11 = 2$ grams per day.

Days to Maturity

- *For Cosmic Yantras*: The days to maturity of tomato plant was recorded in 103 days.
- *For Organic Fertilizer*: The days to maturity of tomato plant was recorded in 110 days.

Yield and Yield Component

- *For Cosmic Yantras*: The yield component of tomato plant was recorded in 103 days (40 g).
- *For Organic Fertilizer*: The yield component of tomato plant was recorded in 110 days (35 g).

Leaf Area Index

- Formula for leaf area index = Total leaf area / ground area.
- Total leaf area is measured in square unit (square meter).
- Ground area is typically expressed in square meter (m^2).
- *For Cosmic Yantras*: $5 + 3.5 + 2.6 + 3.7 + 5.7 + 4.9 + 2.9 + 4.6 + 5.4 + 4.3 = 42.6$ cm = $42.6/20 = 2.13$ m^2 .
- *For Organic Fertilizer*: $3.2 + 2.6 + 3.4 + 4.1 + 2 + 2.3 + 3.3 + 3.5 + 3.5 = 27.9$ cm = $27.9/20 = 1.39$ m^2 .

Phenological Aspects of *Pisum sativum* L.

It describes the sequential growth and development stages of the plant, influenced by environmental situation or conditions like temperature, light, and moisture. These stages are essential for optimizing cultivation practices and improving yield.

- *Seed Germination and Emergence*: 7–10 days of duration after sowing. Seed absorbs water, radicles emerge and the plumule breaks through the soil surface.
- *Seedling Stage*: 2–3 weeks of duration after germination. The plant develops its first true leaves and establishes a strong root system.
- *Vegetative Growth*: 3–5 weeks of duration after emergence. Rapid growth of leaves, stems and tendrils occurs. The plant builds a framework for future flowering and pod development.
- *Flowering*: Begin 30–45 days of duration after sowing. Pea plants produce white, pink or purple flowers depending on the variety. This stage is critical for pollination and subsequent pod formation.
- *Pod Formation*: 50–70 days of duration for pod formation after sowing. Fertilized flowers develop into pods, which gradually enlarge.
- *Pod Filling*: 10–20 days of duration for pod filling after pod formation.
- *Maturing and Harvesting*: 80–100 days of duration for maturing and harvesting after sowing.

Yield Aspects of *Pisum sativum* L: This Is Influenced by Genetic, Agronomic, and Environmental Factors

- *Pod Yield*: Relevant for fresh market peas (e.g., garden peas or snow peas).
- *Seed Yield*: Critical for dry peas or seed production.
- *Biological Yield*: Total biomass including stems, leaves, pods and seeds.

Phenological Parameters Used to Study Pea Plants [1]

- *Germinating Percentage*: $\text{number of pea plants germinate} \div \text{total number of pea plants germinate} \times 100$.
- *For Cosmic Yantras Fertilizer*: The germinating percentage of pea plants were recorded in 15 days with 60% ($9 \div 15 \times 100$).
- *For Organic Fertilizer*: The germinating percentage of pea plants were recorded in 10 days with 74% ($11 \div 15 \times 100$).

Day to Germination

- *For Cosmic Yantras*: The day to germination of pea plant was recorded in 14 days.
- *For Organic Fertilizer*: The day to germination of pea plant was recorded in 17 days.

Seedling Emergence

- *For Cosmic Yantras*: Seedling emergence of pea plant was recorded in 15 days.
- *For Organic Fertilizer*: Seedling emergence of pea plant was recorded in 17 days.

Pod Set and Filling

- *For Cosmic Yantras*: The pod set and filling of pea plant was recorded in 12–15 days.
- *For Organic Fertilizer*: The pod and filling of pea plant was recorded in 13–17 days.

Days to Flowering

- *For Cosmic Yantras*: The days of flowering of pea plant was recorded in 48 days.
- *For Organic Fertilizer*: The days of flowering of pea plant was recorded in 51 days.

Day to Maturity

- *For Cosmic Yantras*: The days of maturation of pea plant was recorded in 93 days.
- *For Organic Fertilizer*: The days of maturation of pea plant was recorded in 98 days.

Yield and Yield Component

- *For Cosmic Yantras*: The yield and yield component of pea plant was 25 gm with observation recorded.

- *For Organic Fertilizer:* The yield and yield component of pea plant were 15 gm with observation recorded.

Leaf Area Index

- Formula for leaf area index = Total leaf area \ ground area.
- Total leaf area is measured in square unit (square meter).
- Ground area is typically expressed in square meter (m²).
- *For Cosmic Yantras:* $4 + 3.5 + 2.5 + 3.3 + 4.5 + 3.8 + 2.9 + 4.4 + 5 + 4.6 = 38.5 \text{ cm} = 38.5 / 17 = 2.26 \text{ m}^2$.
- *For Organic Fertilizer:* $3.5 + 2.6 + 3.4 + 4.4 + 4 + 3 + 3.6 + 3.3 + 4.6 + 4.2 = 36.6 \text{ cm} = 36.6 / 17 = 2.15 \text{ m}^2$.

The phenological parameters can be used to study various aspects of tomato and pea plant growth and development, such as:

- Response to environmental factors (temperature, moisture and light).
- Response to agronomic practices (irrigation, fertilization and pruning).
- Genetic variation and heritability of traits.
- Crop improvement and breeding programs.

Figure 1(a-d) shows the bar graph & line graph of *Pisum sativum* L. & *Solanum lycopersicum* L.

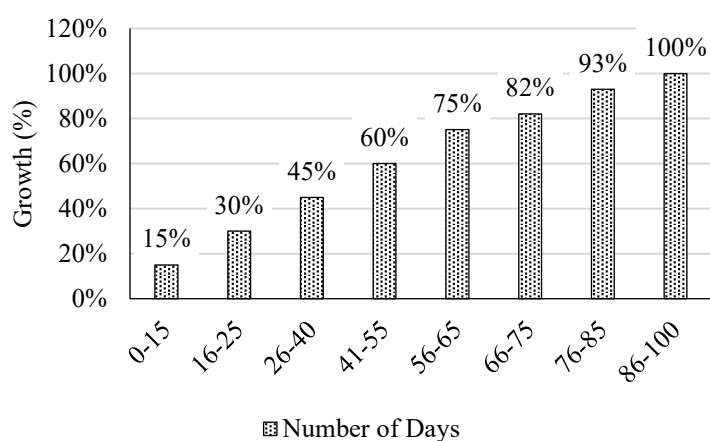


Figure 1(a). Bar graph of Pea (*Pisum sativum* L.).

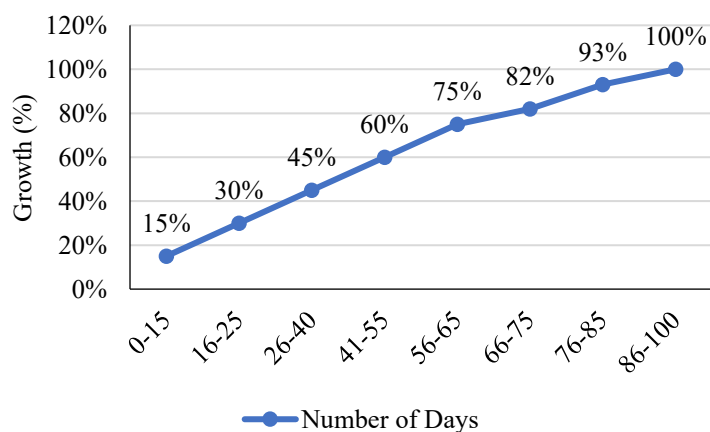


Figure 1(b). Line graph of Pea (*Pisum sativum* L.).

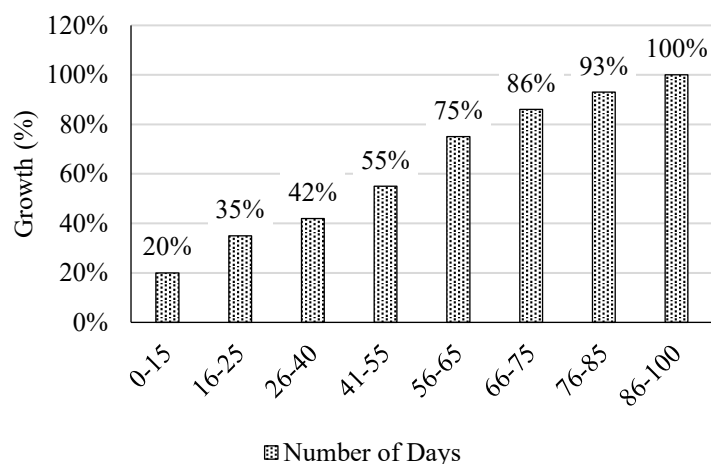


Figure 1(c). Bar graph of tomato (*Solanum lycopersicum* L.).

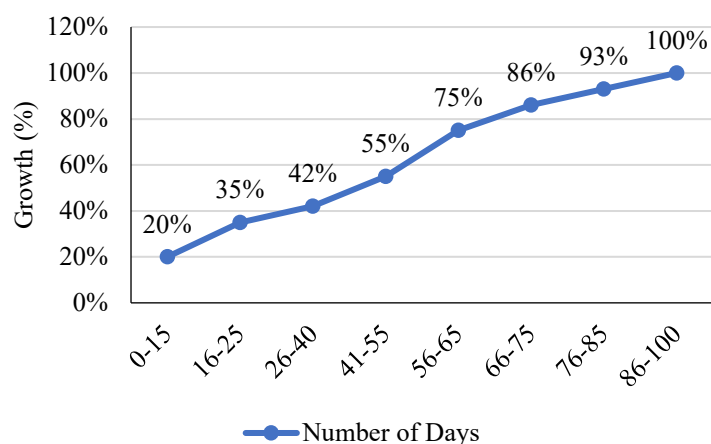


Figure 1(d). Line graph of tomato (*Solanum lycopersicum* L.).

DISCUSSION

In the present study, the growth, production, and quality of the tomato and pea types under investigation were significantly impacted by the cosmic yantras in this study; the results are shown in (Figures 2–7). The impact of cosmic yantras on tomato and pea height differed significantly, as seen in Figures 2(a), 3(a), 4(a), 5(a), 6(a) & 7(a). According to the findings, cosmic yantras had the greatest impact on plant height, whereas organic fertilizer (cow dung) had the least (Figures 2(b), 3(b), 4(b), 5(b), 6(b) & 7(b)). Tomato and peas variety responded the most to cosmic yantras as compared with organic fertilizer. The result of effect of cosmic yantras on stem diameter of the studied tomato and pea had best effect on stem and the organic fertilizer has the least effect on the stem. Tomato and pea variety responded the most to cosmic yantras as compared to organic fertilizer. Even through organic fertilizer slight influence on number of branches of tomato and pea, there was no significant difference has been observed parameter. Tomato and pea had response to the cosmic yantra on the leaf area index. Treatment with organic fertilizer increase leaf area index of tomato and pea significantly. Tomato and pea root length was significantly impacted by cosmic yantras. Additionally, organic fertilizer had the least impact on tomato and pea root length. The fresh leaves of tomato and pea plants responded well to cosmic yantras, whereas organic fertilizer had the least impact. Nutrient availability in the soil influences how crops react to the application of cosmic yantras. Additionally, crops apply more organic fertilizer to low-nutrient soil than to high-nutrient soil. In addition to releasing nutrients into the soil, organic fertilizer enhances the chemical and physical characteristics of the soil, which promotes crop development and growth.

Tomato Crop

Cosmic yantras were shown to have the greatest influence on plant height, number of branches, root length, pod filling, fruit development rate, leaf area index, flower and fruit set, seed growth, maturity, yield, and yield component. Additionally, the growth stage of the tomato pea cultivars under study was least affected by organic fertilizer. The number of blooms, number of fruits, and fruit production of the tomato and pea types under study were measured. The germinating percentage of tomato plants with the cosmic yantras were recorded in 10 days with 86% and the germinating percentage of tomato plants with the organic fertilizer were recorded in 15 days with 80%. Whereas the germinating percentage of pea plants with cosmic yantras were recorded in 15 days with 74% and the germinating percentage of pea plant with organic fertilizer were recorded in 10 days with 60%. The numbers of leaves of tomato plants were increased because of cosmic yantras and numbers of leaves of tomato plants were decreased with the application of organic fertilizer. Whereas the number of leaves of pea plant were also increased due to effect of cosmic yantras and numbers of leaves of pea plants were decreased with the application of organic fertilizer. The flowering days of pea plants were recorded in 48 days with cosmic yantras, and the flowering days of pea plants were recorded in 51 days with the application of organic fertilizer.



Figure 2(a). Represent the initial stage of the tomato plant with cosmic yantras.



Figure 2(b). With organic fertilizers.



Figure 3(a). Displays the leaves and the flower of tomato plant with cosmic yantras.



Figure 3(b). With organic fertilizers.



Figure 4(a). Shows the fruiting stage of the tomato with cosmic yantras.



Figure 4(b). With organic fertilizers.



Figure 5(a). Represent the initial stage of pea plant with cosmic yantras.



Figure 5(b). With organic fertilizers.



Figure 6(a). Displays the leaves of pea plant with cosmic yantras.



Figure 6(b). With organic fertilizers.



Figure 7(a). Shows the fruiting stage of pea plant with cosmic yantras.



Figure 7(b). With organic fertilizers.

CONCLUSION

This study showed that the potential increase in the growth and yield of tomato (*Solanum lycopersicum*) and pea (*Pisum sativum*) plants by the using of cosmic yantras. It was noticed that there was significant increasement in the yield and growth parameter were observed, such as number of leaves, number of flowers, fruit growth rate, pod set and filling, maturation, and yield components, with the application of cosmic yantras. Pea and tomato plants performed better with the cosmic yantras as compared organic fertilizer under normal climate condition. When we conducted this experiment and observed the effect of cosmic yantras and organic fertilizers, we found that cosmic yantras are more beneficials. This research concluded that sunlight has the most significant effect on plants without causing any harm. We only used normal water in the pots, which shows that plants can grew even without organic fertilizers and inorganic fertilizers. We want to convey to farmers that they should use cosmic yantras, as they are not expensive and have no side effects.

Recommendation

In this research, we want to recommend that policymakers promote the use of cosmic yantras, as they are quite beneficial and have no side effects. We cannot say they are much better than fertilizers, but there is some difference. So, we would also like to tell farmers to use cosmic yantras, as they have no side effects and are not costly either.

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