

# Effect Of Different Sources Of Organic And Inorganic Fertilizers On A Morphological Parameter Of Sunflower.

(*Helianthus annuus.L.*)

Gayathri Priyadarshini G<sup>1</sup>, and \*Dr. P. Indira  
Research Scholar, Associate Professor  
Department of Plant Biology and Plant Biotechnology  
Quaid-E-Millath Government college for Women  
Annasalai, Chennai – 600002.  
Tamilnadu, India.

## ABSTRACT

In order to evaluate the of the length of the plant fresh and dry weight, head diameter and weight of the seeds of sunflower in response to different organic and inorganic fertilizer sources, an experiment was conducted with different waste compost at different concentration of inorganic fertilizer on sunflower plant. These treatments were arranged with three replicates such as compost of vegetable waste, sugarcane waste and coconut coir waste were prepared and applied to the field as treatment. Inorganic fertilizer of different concentration such as 25%, 50%, 75% & 100% of ratio 60:30:30 of NPK applied to the field as inorganic fertilizer. The growth of the plants was recorded on 15<sup>th</sup> day, 30<sup>th</sup> day, 45<sup>th</sup> day, 60<sup>th</sup> day and 90<sup>th</sup> day. Result showed that the plant with combined compost gives better result compared with other application.

**Keywords:** agronomic, sun's azimuth, ody painting, allopathic, vernalization.

## INTRODUCTION

Sunflower plant belongs to the family Asteraceae. The genus *Helianthus* contains 65 different species of which 14 are annual herbs. The sunflower plant originated in eastern North America. Since 3000 B.C a wide range of uses of sunflowers have been reported throughout the world such as ornamental plants, medicinal, alimentary, feedstock, fodder, dyes for the textiles industry, ody painting, decorations and so on. Sunflower species are allopathic in nature and this crop appears to have a bright future, especially if the scientists can translate the cutting edge research into technologies that will reduce their reliance on synthetic herbicides, pesticides, and crop protection chemicals.

Sunflower is an annual, erect, broadleaf herb with a strong taproot and prolific lateral spread of surface area. Stems are usually round early in the season, angular and woody later in the season and normally unbranched. Sunflower leaves are phototropic and will follow the sun's rays with a lag of 120 behind the sun's azimuth. It is a tolerant of both low and high temperature however, more tolerant to low temperature. The seed is not affected by vernalization (cold) in the early germination stages. Extremely high temperatures have been shown to lower oil percentage, reduce seed fill and germination. Providing suitable fertilization for soil by the balanced use of inorganic fertilizers and the important aspects of agronomic management to reach the maximum yield and optimal quality for agronomic crops and to minimize their harmful effects on the environment. (Milan Jockovic *et al* 2014). A large number of sunflower seeds are a source of raw material required for industrial purposes in human and animal food and nonfood applications.

## MATERIALS AND METHODS

For evaluation of yield and yield components of sunflower in response to different organic compost sources and inorganic fertilizers, an experiment was conducted in the field of Quaid-E- Millath college for women, Chennai: 2. The effects of organic and chemical fertilizers were tested on Sunflower (*Helianthus annuus.L.*). Randomized Block Design

(RBD) method was charted and implemented in the agricultural field with three replications and eight treatments. Size of plots in all treatment 2feet x 1feet was arranged for growing of Sunflower (*Helianthus annuus*) crop. Chemical fertilizers such as urea, single super phosphate and urate of potash were used combinedly after one month from sowing while organic fertilizers were applied in the soil before one month from sowing according to treatments. Treatment consists of vegetable waste compost(T1), sugarcane waste compost (T2), coconut coir compost (T3), all three T1, T2 &T3 are combined as T4, chemical fertilizers were applied in the proportions of 60:30:30 Kg of NPK/ha according to recommended dose of fertilizers of 25% as T5, 50% asT6,75% asT7,100% asT8. The process of composting was followed by as described by Chavan et al (2015). A total of 100 seeds were planted in each plot. The drip irrigation system was used in the whole study area of plots. A common dose of organic fertilizers including vegetable waste compost (T1), sugarcane waste compost (T2) and coconut coir compost (T3) all three T1,T2 &T3 combined as T4 was used to the plots having size 2feet x 1feet at same rate @ 1.25 kg/plot (@ 0.625 kg/sq. m) as per usual practice of farmers. Straight chemical fertilizers (urea-21.7gm + single super phosphate – 31.25gm + urate of potash – 8.3gm) combinedly used in treatment T5, T6, T7 and T8 having plot size 2m x 1m. Seeds were sown on offseason of the first week of July. All plants were selected at the time of harvesting from each unit plot for the assessment of yield components of Sunflower crop. The growth parameters of Sunflower crops were observed at 30, 60,75 and 90th day from the date of planting.

### III. EXPERIMENTAL DETAILS AND CULTIVATION PRACTICE FOR SUNFLOWER CROP WERE SUMMARIZED BELOW

- Botanical name: *Helianthus annuus* L.
- Variety: Hybrid CO2
- Experiment: Field experiment.
- Plot size: 2feet x 1feet.
- Replications: Three
- Crop population per plot: 100(Crop spacing 45cm X 30cm) .
- Treatments: Control and EightTreatment

#### Treatment Details

- T0- Control, soil without fertilizers
- T1 -compost prepared from vegetable waste
- T2 - compost prepared from sugarcane waste
- T3 – compost prepared fromcoconut coir waste
- T4 –a combinations of T1, T2& T3
- T5 –inorganic fertilizer (ie)NPK OF 25%
- T6- NPK of 50%
- T7 – NPK of 75%
- T8- NPKof 100%

### IV. Result and Discussion

Results obtained in the present investigation are discussed below. All the values of nutrients found after their analysis in the laboratory with known standard methods for prepared organic fertilizers and experimental soil are represented here.

#### Plant Height (Cm/Plant)

Average plant height (cm) in the treatments T0, T1, T2, T3, T4,T5,T6 ,T7&T8 were found to be 32.53±1.74, 40.27±2.53, 62.93±1.90, 63±1, **71.4±2.23**, 38.6±1.217, 37.4±3.34, 36±2.65 &29.33±2.89

respectively after 30th day (fig.1). The data on growth performance is presented in Table no. 2. It indicates that maximum plant height (71.4cm/plant) of sunflower crop was obtained after 30th day in treatment T4 when combined compost of organic fertilizer applied followed by coconut coir treatment (T3) and it is lower in control treatment (T0). After 60th day average plant height (cm) in the treatments T0, T1, T2, T3, T4,T5,T6 ,T7&T8 were found to be 100.67±1.15, 128.3±4.00,131.93±1.79, 120.67±5.13, **156.2±3.061**, 142.3±2.46, 114±4.58, 114±4.58 & 107±1.73 respectively (fig.1). After 60th days, the maximum height of the plant (156cm/plant) was recorded with the application of combined compost (T4) and it was lower (100cm/plant) in control T0.

### Head Diameter (Cm/Plant)

After 90th days, average head diameter (cm/plant) of Sunflower crop in the treatments T0, T1, T2, T3, T4, T5, T6, T7 & T8 were found to be  $3.5 \pm 0.41$ ,  $3.5 \pm 0.36$ ,  $4.53 \pm 0.05$ ,  $3.3 \pm 0.26$ ,  **$7.5 \pm 0.41$** ,  $6.33 \pm 0.58$ ,  $4.67 \pm 0.24$ ,  $3.17 \pm 0.24$  &  $3 \pm 0$  respectively (fig.2). The maximum (7.5 cm/plant), minimum (3.5 cm/plant) and lower (3.0 cm/plant) of head diameter of Sunflower plant were observed with application of combined compost treatment (T4), vegetable waste treatment (T1) and chemical fertilizer of 100% field treatment (T8) respectively after 90th day.

### Mean weight of fresh weight and dryweight

After 90th days, average weight of a plant with the head (gm/head) of Sunflower crop in the treatments T0, T1, T2, T3, T4, T5, T6, T7 & T8 were found to be  $27.67 \pm 2.52$  gm,  $39.00 \pm 3.61$ ,  $44.33 \pm 4.04$ ,  $35.00 \pm 5.00$ ,  $141.67 \pm 12.58$ ,  $81.00 \pm 6.56$ ,  $59.33 \pm 4.04$ ,  $26.67 \pm 6.51$  &  $17.67 \pm 2.52$  respectively (fig.3). The highest mean fresh weight of plant /head (141.67 gm/head) was recorded in combined compost treatment (T4). The minimum weight of fresh weight/head (17.67 gm/head) was recorded in control treatment T8.

### Weight of 50 seeds (gm)

After 90th days, weight of 50 seeds of Sunflower crop in the treatments T0, T1, T2, T3, T4, T5, T6, T7 & T8 were found to be 1 gm, 0.99 gm, 1.01 gm, 1.21 gm, 1.06 gm, 0.99 gm, 1 gm, 1.2 gm and 0.97 gm respectively (fig.4). The maximum dry weight of 50 seeds of sunflower crop (1.21 gm/plant) was recorded in coconut coir treatment T3 followed in order by treatment T7 (1.2 gm/plant), treatment T4 (1.06 gm/plant), treatment T2 (1.01 gm/plant), treatment T0 & T6 (1 gm/plant), T1 & T5 (0.99 gm/plant) and treatment T8 (0.97 gm/plant).

TABLE 1: Root length of *Helianthus annuus.L*

Treatment	ROOT LENGTH			
	7TH DAY	15TH DAY	30TH DAY	60TH DAY
T0	$3.67 \pm 0.29$	$4.23 \pm 0.25$	$5.20 \pm 0.20$	$7.67 \pm 1.15$
T1	$7.83 \pm 0.76$	$3.93 \pm 0.12$	$8.6 \pm 0.53$	$11.63 \pm 0.55$
T2	$5.7 \pm 0.26$	$4.47 \pm 0.84$	$10.6 \pm 0.53$	$17.6 \pm 0.53$
T3	$6.63 \pm 0.32$	$8.17 \pm 0.76$	$11 \pm 1$	$12 \pm 1$
T4	$3.86 \pm 0.017$	$4.74 \pm 0.06$	$12.07 \pm 0.31$	$16.87 \pm 0.32$
T5	$3.97 \pm 0.06$	$4.43 \pm 0.12$	$8.6 \pm 0.53$	$12.63 \pm 0.55$
T6	$2.6 \pm 0.26$	$3.07 \pm 0.12$	$10.07 \pm 0.31$	$7.33 \pm 0.58$
T7	$2.03 \pm 0.06$	$5.6 \pm 0.1$	$10 \pm 1$	$11 \pm 1$
T8	$3.67 \pm 0.29$	$9.33 \pm 0.58$	$10.33 \pm 0.58$	$6.33 \pm 0.58$

FIGURE 1: Root length of *Helianthus annuus.L*

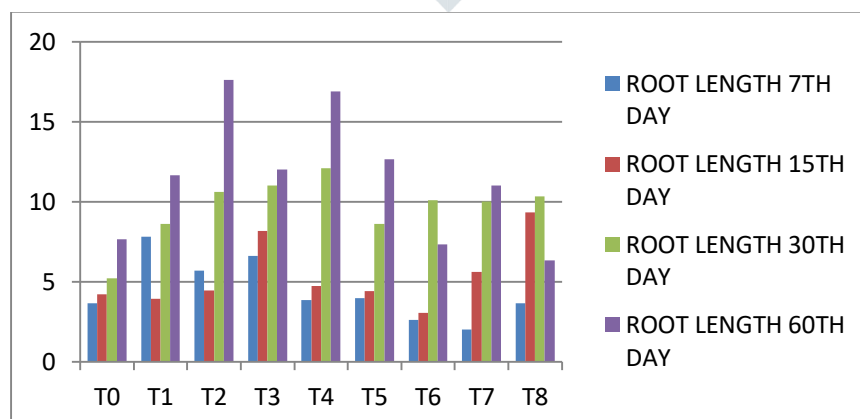
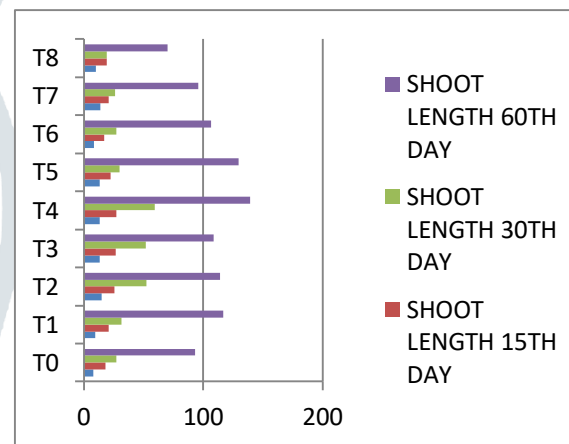


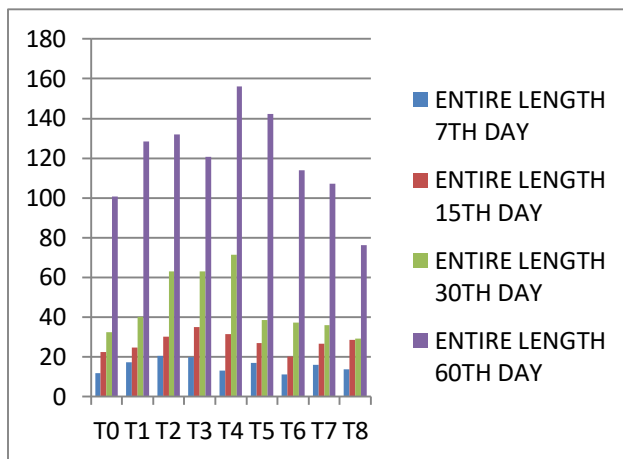
TABLE 2:Shoot length of *Helianthus annuus.L*

Treatment	SHOOT LENGTH			
	7TH DAY	15TH DAY	30TH DAY	60TH DAY
T0	8.03±6.03	18.33±1.5	27.33±1.53	93.00±2.00
T1	9.47±5.6	20.8±0.72	31.67±2.08	116.67±3.51
T2	14.7±0.26	25.8±0.26	52.33±1.53	114.33±1.53
T3	13.3±0.25	26.83±0.31	52±1	108.67±4.16
T4	13.23±2.80	27.13±0.81	59.33±2.08	139.33±3.06
T5	13.1±0.1	22.63±0.55	30±1	129.67±2.52
T6	8.67±0.29	17.17±1.04	27.33±3.06	106.67±4.16
T7	14.1±0.95	21±1	26±2.65	96±1
T8	10±1	19.17±0.76	19±2.65	70±1

FIGURE 2: Shoot length of *Helianthus annuus.L*TABLE 3:Entire Length of *Helianthus annuus.L*

Treatment	ENTIRE LENGTH			
	7TH DAY	15TH DAY	30TH DAY	60TH DAY
T0	11.7±5.9	22.57±1.44	32.53±1.74	100.67±1.15
T1	17.3±6.32	24.73±0.83	40.27±2.53	128.3±4.00
T2	20.4±0.26	30.27±1.10	62.93±1.90	131.93±1.79
T3	19.77±0.23	35±0.78	63±1	120.67±5.13
T4	2.97±0.1	31.6±0.85	71.4±2.23	156.2±3.061
T5	17.07±0.12	27.07±0.49	38.6±1.217	142.3±2.46
T6	11.27±0.23	20.23±1.12	37.4±3.34	114±4.58
T7	16.13±0.95	26.6±1.05	36±2.65	107±1.73
T8	13.67±1.26	28.5±0.87	29.33±2.89	76.33±0.58

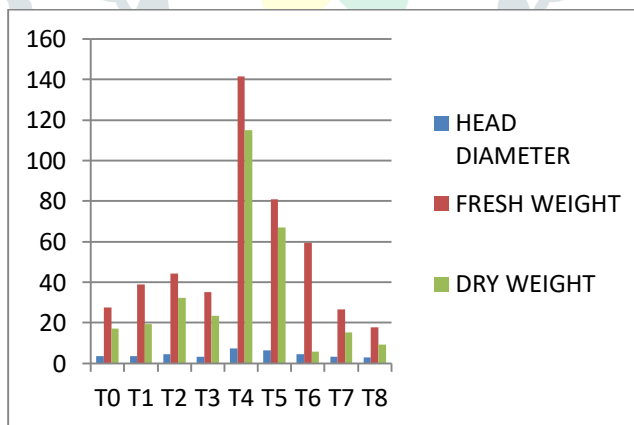
**FIGURE 3: Entire Length of *Helianthus annuus.L***



**TABLE 4 :Head Diameter, Fresh Weight and Dry Weight of *Helianthus annuus.L***

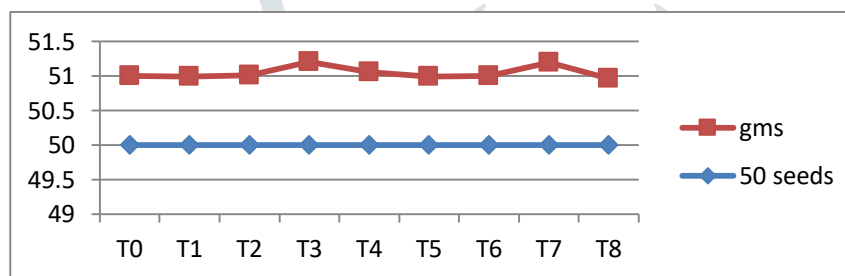
Treatment	HEAD DIAMETER	FRESH WEIGHT	DRY WEIGHT
T0	3.5±0.41	27.67±2.52	17±2
T1	3.5±0.36	39.00±3.61	19.33±1.15
T2	4.53±0.05	44.33±4.04	32.33±6.43
T3	3.3±0.26	35.00±5.00	23.33±5.77
T4	7.5±0.41	141.67±12.58	115±15
T5	6.33±0.58	81.00±6.56	67±6.08
T6	4.67±0.24	59.33±4.04	5.86±5.86
T7	3.17±0.24	26.67±6.51	15.33±6.11
T8	3±0	17.67±2.52	9.17±1.44

**FIGURE 4:Head Diameter, Fresh Weight and Dry Weight of *Helianthus annuus.L***



**TABLE 5:Weight of 50 seeds of *Helianthus annuus.L***

Treatment	50 seeds	Gms
T0	50	1
T1	50	0.99
T2	50	1.01
T3	50	1.21
T4	50	1.06
T5	50	0.99
T6	50	1
T7	50	1.2
T8	50	0.97

**FIGURE 5: TABLE 5:Weight of 50 seeds of *Helianthus annuus.L*****Conclusion:**

The result of this study suggested that the morphological parameter such as plant height, head diameter, weight of the fresh plant, dry plant and weight of 50 seeds significantly increased in combined application.

**Reference:**

1. M.M. Vedpathak and B.L. Chavan. (2016). Studies on the impact of organic and chemical fertilizers on growth and yield of Sunflower. (*Helianthus annuus L*). Journal for research. vol 02. (India), 2395-7549
2. Sana Abdslam\*, (Dr.) E.P. Lal, et al., (2016). Effect of biofertilizers on growth and yield of sunflower comparison in Indo-bian natural condition. ISOR Journal of agriculture and veterinary science. Vol 9. (India), 2319-2380.
3. Abbas Fallah TOOSI, Mehdi AZIZI. (2014). Effect of different sources of nitrogen fertilizer on yield & yield components of sunflower (*Helianthus annuus L*). science papers. Series A Agronomy, Vol LVII, Iran. 2285-5793.