

EVS MAJOR PROJECT

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SUBJECT: EVS

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SLOT: A11-A12

EFFECT OF FERTILIZERS ON PLANTS

-BY ANANYA PRASAD

OBJECTIVE

ENVIRONMENTAL PROBLEM:

To maximize the yield and increase efficiency chemicals(fertilizers) are used. Though it helps the plant to grow faster, it has serious long-term effects on the environment. The plants too seem healthy for the time being, but gradually they are affecting the plants. The plants do not have a good root system and will not take proper time to grow and mature, and bloom earlier.

Fertilizer composes mainly of nitrogen, phosphorus, potassium in the form of ammonia, urea, nitric acid and ammonium sulphate. It also includes calcium, magnesium and sulphur in small quantities. Micronutrients such as iron, chlorine, copper, manganese, zinc and boron are also present in the mixture.

Problems that fertilizers cause in the long run:

AIR POLLUTION: These fertilizers will produce toxic chemicals as by-products such as methane and carbon dioxide which would cause air pollution.

WATER POLLUTION: Depletion of groundwater water and water bodies such as lakes and rivers due to farm runoff, oxygen depletion in water bodies, weed growth, algal bloom, ammonia toxicity, nitrate poisoning and water eutrophication.

OTHER: Increase in soil salinity/acidity, heavy metal accumulation in plants and soil system.

HUMANS: Mineral depletion in the food, toxic for life in general. It can cause DNA damage, increased cellular degeneration and death.

Seeing all this I chose this topic. I wanted to see if we can sustain and grow the same yield without fertilizers. The experiment I performed helped me understand this.

METHOD

The main objective of my project is to check whether we can grow the same plant without the use of fertilizers. The use of fertilizers can be omitted by using natural manure.

- I observed a set of two healthy plants for three weeks (21 days).
- In one of the potted flowering plants, I added farm natural manure to help the plant grow.
- In the other potted flowering plant, I added commercial fertilizer for observation purposes.
- Both were kept side by side under the sun and at the same temperature(cold).
- I measured the height of both the plants weekly and recorded them.
- The condition of both the plants was recorded by clicking their photographs.
- At the end of the experiment, I dug out the plants to compare their root lengths.
- Found out the root-shoot ratio.
- Recorded the observations.

OBSERVATION

FERTILIZER(A)

PARAMETERS	HEIGHT(CM)	ROOT LENGTH(CM)	ROOT-SHOOT RATIO
WEEK1	15.9	-	-
WEEK2	17.1	-	-
WEEK3	18.4	11.2	0.608

MANURE(B)

PARAMETERS	HEIGHT(CM)	ROOT LENGTH(CM)	ROOT-SHOOT RATIO
WEEK1	13.1	-	-
WEEK2	14.9	-	-
WEEK3	16.2	13.2	0.814

WEEK 1



(A)



(B)

WEEK 2



(A)



(B)

WEEK 3



(A)



(B)

ROOTS



(A)

(B)

RESULT & CONCLUSION

According to the observations,

- The plant was taller in the case of the plant (A) than plant(B).
- The root was shorter in the case of the plant (A) than (B).
- The root shoot ratio of the plant(A) was lesser than plant (B).

The root-shoot ratio helps to see how effective the plant is to gain resources.

According to the studies, shoot length is comparatively higher in the early stages and root length in later phases. The fertilizer enhances the height of the plant for better light exposure.

Seeing the observations, it can be concluded that the plant with fertilizer was healthier than the other plant. But we cannot forget how harmful those chemicals for the environment, which have been discussed before.

- This means we have to make organic farming work better than before to get equivalent results.
- It is safer in the long run even if the yield is a little less. It wouldn't harm the environment as the fertilizers do.
- Manure applications leave the microbial community in the soil more active, which improves soil quality. The extra organic matter also helps soil hold onto water a little better.

Maybe fertilizers give immediate results but it is not good in the long run.

The observations were made during the coldest part of the year, which can be a source of error.

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