EFFECTS OF COMPOST APPLICATION ON CRESS (*LEPIDIUM SATIVUM*) PRODUCTIVITY IN IRAN

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1 INTRODUCTION

The needs to increase food production to feed the world population more securely, requires to draw on any available and safe method. Using compost in sustainable agriculture manner preserves agro-ecosystems and environmental quality (Tafaghodinia 2008).

The utilization of compost is not a standard practice in commercial agriculture. For agricultural markets to develop and use of compost to become a standard practice, the agronomic benefits and safe use of compost application must be demonstrated and a cost benefit analysis developed (Weltzein 1989).

Lack of adequate nutrient supply and poor soil structure are the principal constraints to crop production under low input agriculture systems. Chemical fertilizers are not the most suitable solution to overcome these constraints, especially for vegetables that have short growing period and are consumed fresh. Uses of chemicals are also expensive and a threat to human health (Weltzein 1990). Cress is one of fresh vegetable that could find in Iranian meals.

We suggest looking for alternatives to chemical fertilizers such as compost, which is cheaper than other sources of nutrients and relatively safe (Rindle 1997). The use of compost has a role in plant disease management and soil fertility in greenhouse. This project seeks to assess the ability of compost to increase production and have increased crop production of Cress plant almost twice as much as other plot. The goal of this project was to demonstrate the benefits of compost application in commercial agriculture for the purpose of securing markets for municipally derived compost.

2 MATERIALS AND METHODS

The demonstration site is located on farm of Iranian Research Organization for Science and Technology (IROST) and spans over 160 square meters in size. The experiment was designed for a side-by-side comparison of compost application to current agronomic practices. It was divided into six equal plots (2×1.5 m). The plots number 2, 4 and 5 were randomly chosen for compost application (Figure 1).

The composted yard waste was prepared from yard waste collected from dried and wet plant and from the IROST field and Cow Excrement. These materials were blended and composted during 21 days. The compost release total organic nitrogen, phosphorus and potassium over the growing period. The compost was applied at rate 10 kg for each treatment plot. After application, the compost was mixed into soil. Demonstration Site was divided into six equal three square meters plots and three plots were randomly chosen for compost application (Figure 1).

6 Rows Plot1	6 Rows Plot2 (compost)	6 Rows Plot3	6 Rows Plot4 (compost)	6 Rows Plot5 (compost)	6 Rows Plot6

FIGURE 1 **Design of demonstration site**

Cress seeds were planted at a rate of 20 grams per plot. Growth measurements included height of plants, number of leaves, and yield of crops.

3 RESULTS AND DISCUSSION

Effect of Compost on the Vegetative Parts of cress:

3.1 Cress Height

The height of the plants increased with compost application during the measuring period (Figure 2). The percentage of increase in height was 35.82 percent for the compost application. The model F-value of 72.72 implies the model is significant (P<0.0001). There is only a 0.01% chance that a "Model F-Value" this large could occur due to noise.

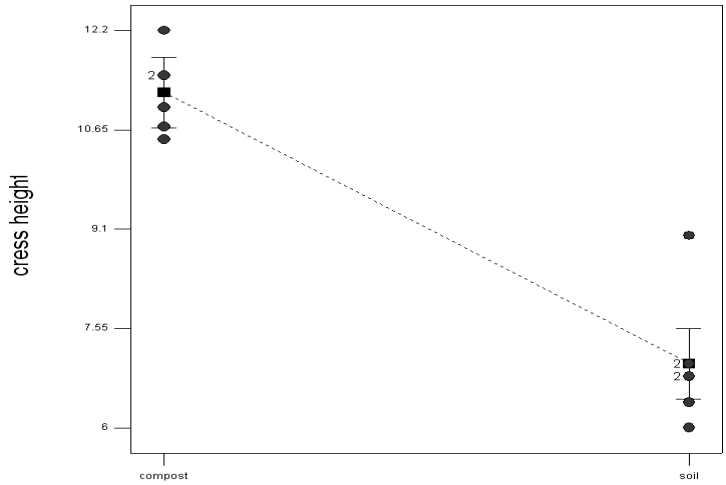

FIGURE 2 **Effect of compost application on cress plant height(mean and error bar)**

3.2 Number of Leaves

The number of leaves also increased with compost application (Figure 3). The percentage of increase in the number of leaves was 76.46 percent for the compost application. Since the increase in the number of leaves did not reduce the size of the leaves (visual observation), the area of photosynthesis increased. This was one of the main factors in growth improvement (Shiralipour and Epstein 1994). The model F-value of 18.39 implies the model is significant (P<0.0128). There is only a 1.28% chance that a "Model F-Value" this large could occur due to noise.

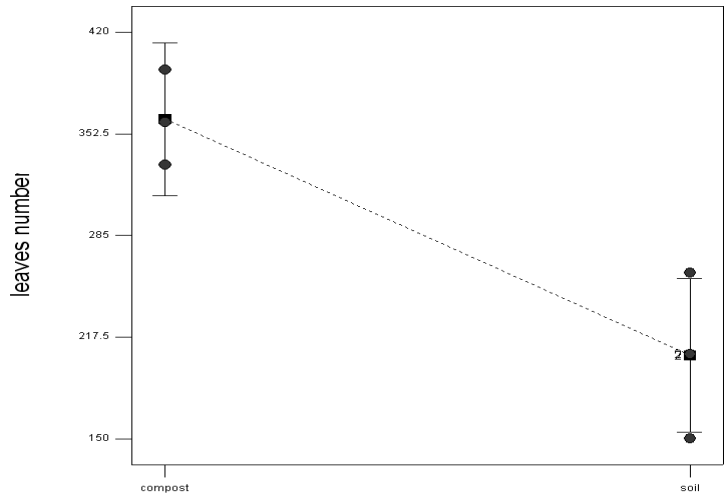

FIGURE 3 **Effect of compost application on the number of leaves on cress (mean and error bar)**

3.3 Crop Yield

Compost increased the cress yield significantly (Figure 4). The increase is probably the result of soil improvement and the nitrogen addition to the soil. The percentage of increase for the compost application of was 46.32 percent for the compost application (P<0.0001). The model F-value of 90.25 implies the model is significant. There is only a 0.01% chance that a "Model F-Value" this large could occur due to noise.

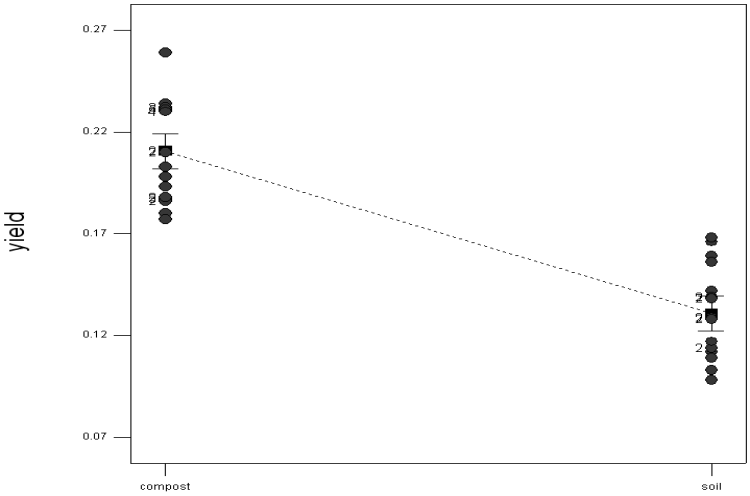

FIGURE 4 **Effect of compost application on cress yield (mean and error bar)**

4 CONCLUSIONS

Apparently, compost application was very effective in improving the physical and chemical properties of the soil, resulting in great improvements of vegetative parts of cress as compared to non-amended plots. In addition to improvement of soil's physical and chemical properties, incorporation of compost into the soil added a considerable amount of available soil nutrients for cress.

The utilization of compost could be a replacement for chemical fertilizers while growing vegetables like cress which need short time for growth and consume freshly. Of course further research on other criteria like pathogens, heavy metals, economics, ... are necessary to complete this results.

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