

## **Effect of Vermicompost with Different Leguminous Crops as Nitrogen Source on the Pest Occurrence and Performance of Carrots (*Daucus carota*)**

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### **Abstract**

This study conducted to evaluate the effect of vermicompost with different leguminous crops as nitrogen source on the pest occurrence and performance of carrots. It was conducted at the Organic Agriculture Project of Capiz State University, Burias Campus, Mambusao, Capiz. A two-cropping study which was laid out in 2x4 factorial experiment using Randomized Complete Block Design (RCBD) with three replications. Factor A was the cropping seasons such as A1- first cropping (January-March) and A2- second cropping (August-October). Factor B was the vermicompost using different leguminous crops as N source which comprised of B1 – Azolla, B2 – Trichantera, B3 – Kakawate, and B4 – Mixed (Azolla, Trichantera, and Kakawate). The data gathered were analyzed using STAR software and LSD test for mean comparisons. The result of the study revealed that vermicompost from different leguminous crops as nitrogen source manifested a comparable responses in all growth and yield parameters of carrots. The study revealed that cropping seasons significantly affected the plant height, number of leaves, length of tuber, diameter of tuber, biomass, and weight of marketable part and non-marketable part. Carrots grown and harvested in the first cropping which falls on January to March had the most number of leaves, length of tuber, diameter of tuber, biomass, and weight of marketable part. While those carrots grown and harvested in the months of August to October (second cropping) produced the tallest plant and increased the non-marketable part. Cropping seasons which fall in the months of January to March is convenient in growing carrots. Carrots applied with vermicompost produced with mixed azolla, tricanthera and kakawate gave the highest net profit with total amount of (Php 1495.70).

**Keyword:** Azolla, Trichanthera, Kakawate

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## Introduction

Carrots (*Daucus carota*), herbaceous, generally biennial plant of the Apiaceae family that produces an edible taproot. Among common varieties root shapes range from globular to long, with lower ends blunt to pointed. Besides the orange-coloured roots, white-, yellow-, and purple-fleshed varieties are known. (Encyclopedia Britannica).

Carrot is grown preferably in elevated areas because it requires low temperature for root development. Carrot grows well and produces high quality root in areas with temperature range of 15.6oC to 18.3oC. In higher temperature, it produces long, slender roots with pale color. (Pinoybisnes.com). It is easy to grow as long as they are planted in loose, sandy soil during the cooler periods of the growing season—spring and fall (carrots can tolerate frost). Depending on the variety and local growing conditions, carrots may take anywhere from 2 to 4 months to mature. (The old farmer's almanac)

According to the International Federation of Organic Agriculture Movements, organic agriculture is a production system that relies on ecological processes, such as waste recycling, rather than the use of synthetic inputs, such as chemical fertilizers and pesticides.

Base on Republic Act No. 10068 or the Organic Act of 2010. This farming practice cumulatively conditions and enriches the fertility of the soil, increases farm productivity, reduces pollution and destruction of the environment, prevents depletion of natural resources, saves on imported farm inputs, and protects the health of farmers, consumers, and the general public

Vermicomposts are organic materials, broken down by interactions between earthworms and microorganisms to produce fully-stabilized organic soil amendments with low C:N ratios. They also have a huge and diverse microbial and enzymatic activity, fine particulate structure, good moisture-holding capacity, and contain nutrients such as N, K, P, Ca and Mg in forms readily taken up by plants. They contain both plant growth hormones and humic acids which can act as plant growth regulators. (Edwards and Arancon, 2006)

Vermicast is an organic by-product of the composting activities of earthworms. Placing earthworms in a pile of compost allows them to make their way through the food and excrete vermicast. Vermicast enriches the soil and helps to ensure that plants receive all the nutrients they need to grow successfully. Vermicast is considered a soil conditioner and is often used as a natural fertilizer in rough soils. (Edwards, 1995)

The study was conducted to determine the effect of vermicompost using different leguminous crops as nitrogen source on the pest occurrence and performance of cucumber in two-cropping seasons. It specifically aimed to: 1. Determine the growth and yield of carrots as affected by vermicompost using various leguminous crops as source of nitrogen; 2. Evaluate which among the leguminous crops as source of N for vermicompost would give the best growth and yield to carrots; 3. Determine the best cropping in growing carrots using the vermicompost made from various leguminous crops as N source; 4. Find out if there is interaction effect between the vermicompost applied and different croppings; 5. Identify and quantify the different pest that would occur on carrots applied with vermicompost with various leguminous crops as N source; and 6. Determine the profitability of growing carrots using vermicast made from leguminous crops as nitrogen source.

## **Materials and Method**

A two-cropping study was conducted at the Organic Agriculture Project of Capiz State University, Burias Campus, Mambusao, Capiz. The study was laid out in 2x4 factorial experiment using Randomized Complete Block Design (RCBD) with three replications. Factor A was the cropping seasons such as A1- first cropping (January- March) and A2- second cropping (August- October). Factor B was the vermicompost using different leguminous crops as nitrogen source which comprised of B1 – Azolla, B2 – Trichanthera, B3 – Kakawate, and B4 – Mixed (Azolla, Trichanthera, and Kakawate). The data on the growth and yield included plant height, number of leaves, biomass, length of tuber, diameter of tuber, weight of marketable part, weight of non-marketable part were gathered and analyzed using the STAR software. Differences among treatment means were compared using the Duncan Multiple Range Test (DMRT).

## **Results and Discussion**

### **Growth and Yield Parameters**

Growth and yield parameters of carrots such as plant height, number of leaves, length of tuber, diameter of tuber, biomass, weight of marketable part and weight of non- marketable part were significantly differ from the two croppings. Plants grown during the first cropping which fall on the months of January to March developed the most number of leaves, longest roots, bigger tuber, greater biomass and yielded the most marketable vegetable. Those plants planted in the second cropping (August-October) had increased the height of the plant and non-marketable part.

Effect of vermicast with various leguminous crops as N source. Vermicast with various leguminous crops as N source were comparable in all growth and yield parameters of carrots. This implies that all parameters was not affected by this factor.

Effect of the cropping seasons. Cropping seasons significantly affected all

growth and yield parameters of carrots.

### **Plant height**

Carrots grown and harvested in the first cropping obtained the total mean of (50.53 cm) while those carrots that were grown and harvested in the second cropping obtained taller plants with a mean of (54.31 cm).

### **Stem girth**

For the result of the number of leaves it was observed that carrots grown and harvested in first cropping obtained the most number of grown leaves with the mean of (22.35) while those carrots grown and harvested in the second cropping had a few number of leaves with the mean of (10.74).

### **Length of tuber**

In terms of the length of tuber, carrots grown and harvested in the first cropping obtained the longest length of tuber which had the mean of (15.58 cm.) On the other hand the second cropping had the shortest length of tuber with the mean of (14.15 cm.)

### **Diameter of tuber**

For the diameter of tuber, carrots grown and harvested in the first cropping produced a smaller tube with the total mean of (33.98 mm) compared to carrots grown and harvested in the second cropping with the mean of (46.46 mm).

### **Biomass**

For the biomass, carrots grown and harvested in the first cropping obtained the heavier biomass which had the mean of (235.07 kg) the application of various leguminous crops as N source in the second cropping had the mean of (190.01 kg.)

### **Weight of marketable part**

In terms of the result of the weight of marketable part, carrots grown and harvested in the first cropping performed highest in producing the mean of 168.44 grams. Carrots grown and harvested in the second cropping obtained the lighter marketable part with a mean of 87.39 grams.

### **Weight of non-marketable part**

For the weight of non-marketable part, carrots grown and harvested in the first cropping obtained the mean of 70 grams while carrots grown and harvested in the second cropping had the mean of 82.76 grams.

## **Plant over vermicompost cost of Carrots**

Carrots applied with vermicompost with Kakawate produced the highest net profit with a total amount of (Php1937.40) which is dissimilar to other treatments. Carrots applied with mixed Azolla, Tricanthera and Kakawate gave the net profit of (Php 1857.00). For carrots which applied with vermicompost with Azolla gave the net profit of (Php 1643.40). On the other hand carrots applied with vermicompost applied with Tricanthera gave the lowest net profit with the amount of (Php 1618.2)

## **Prevalence of Pest**

The total number of insect pest which infested the carrot plants was not affected by the application of vermicast made from various leguminous crops as nitrogen source for two cropping seasons. The most prevalent pests observed were: grasshopper, white flies and army worm.

## **Conclusions**

Based on the results of the study, the following conclusions were drawn: 1. Vermicompost with various leguminous crops as nitrogen source gave comparable in all growth and yield parameters to carrots; 2. Cropping seasons significantly affected all growth and yield parameters to carrots; 3. Growth and yield parameters of carrots such as plant height, number of leaves, and diameter of tuber, biomass and weight of marketable part were influenced by the cropping seasons; 4. There was no interaction effect between cropping season in different leguminous crops as nitrogen source; 5. The different pest infested the carrots was not affected by the different vermicompost. Different pest observed were grasshopper, white flies and army worm; and 6. Carrots applied with vermicompost with Kakawate produced the highest net

## **Recommendations**

Based on the results of the study, the following are recommended: 1. Use vermicompost with mixed Azolla, Tricanthera and Kakawate as nitrogen source to increase the production of plant and for profitable net income. 2. Use any of the leguminous crops as nitrogen source for vermicompost. 3. Grow carrots on the months of January to March. 4. Use of kakawate as vermicompost to produce a high marketable plant. 5. Application of kakawate to carrots to produce a heavy biomass in the first cropping. 6. Conduct more relevant studies to further explore the effect of carrots as affected of vermicompost with different leguminous crops as N source. Use the following modifications: a. Use other root and leafy and fruit crops; b. Utilize higher cost of vermicompost with leguminous crops as N source; and c. Apply vermicompost with leguminous crops as N source

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