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# Morphophysiological Responses of Watercress (*Nasturtium officinale*) Super food to Organic Media

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**ABSTRACT: According to nutritional fact and role of watercress (*Nasturtium officinale*) that have been proved in all previous scientific researches and its title as a super food and human need to healthy food and free chemicals residue products, this research is based on methods which effect on watercress features. In this research we used peat moss in 3 levels (100%, 85%, 70%), vermi compost in 2 levels (15% & 30%), bone meal (in ½ of pots) and poultry fertilizer (in ½ of pots) as bed and fertilizer. The experiment designed in completely randomized blocks system with 4 replications. Data analyses showed that none of mixtures had any significant effects on stem diagonal size factor. Also analyses showed that vermi compost treatment had significant effect on plant seed pods numbers factor in 1% level. In addition the results showed that utilizing of vermi compost and poultry fertilizer with each other have significant effect on plant wet weight.**

**Keywords:** Morphophysiological Responses, Watercress, *Nasturtium officinale*, Organic Media

## INTRODUCTION

According to population growth rate, quantitative/qualitative lack of nutritive elements as its results and proliferation situation of illnesses, food preparation and sickness prevention is the researchers' essential priority. So researchers are looking for foods with great nutrition facts and special medical effects which called Super food.

This name that used in recent years has been defined as a food that is considered to be very good for your health and that may even help some medical conditions by macmillan dictionary. In this research physiological changes of super food of super foods, Watercress (*Nasturtium officinale*) produced in organic media have beenanalysed. Watercress (*N. officinale*) is an aquatic or semi-aquatic perennial plant. It is directly a member of the family Brassicaceae. Watercress contains significant and great amount of Iron, Folic acid, Manganese and Calcium, in addition to vitamins C, B6, K and A (USDA database). Watercress is also a significant source of omega-3 fatty acids primarily in the form of 16:3n-3(Hexadecatrienoic acid) at 45 mg/100g (Pereira and Sinclair 2001). In addition to its foresaid facts, watercress contains different type of phytochemicals such as Gluconasturtiin that belongs to Glucosinolates chemical group. Watercress contains also a type of enzymes that named Myrosinase that when gathers with gluconasturtiin during the chewing, Phenethyl isothiocyanate (PEITC) will be produce. This amazing product can prevent, fight and inhibit cancerous cells and tumours.

Watercress shoot tissue biomass was influenced by N fertilizing and Shoot tissue N percentage was influenced by N treatment concentrations (Kopsell *et al.* 2007).

Transplanting watercress to Cold Spring showed an increase in watercress biomass (Amrod *et al.* 2010).

The analysing of Nitarte uptake by hydroponically grown watercress showed that, distribution of TN throughout the plant is not uniform. The TN content is highest in the leaves and least in the roots (Robertson *et al.* 2012).

Vermicompost applications will increase strawberry growth and yields significantly; including increasing of up to 37% in leaf areas, 37% in plant shoot biomass, 40% in numbers of flowers, 36% in numbers of plant runners and 35% in marketable fruit weights (Arancon *et al.* 2004).

Experiment shows results from both pot and field experiments on the N and P effects of meat and bone meal that yield increases significantly on cereals and rye grass (Alhaji *et al.* 2006).

## MATERIALS AND METHODS

For the planting bed we used 3.5 kg pots with peat moss, vermi compost, bone meal, poultry fertilizer that in 12 different dosages were mixed together as Table 1 in completely randomized blocks system with 4 replications.

We measured 3 morphophysiological factors of stem diagonal size, seeds pods numbers and plant wet weight. For measuring the stem diagonal size we used digital caliper. For seeds pods numbers we used optic numeration method. And for plant wet weight we used a digital scale with readability of 0.001g. Also the laboratory analyses of bed inputs gathered as Table 2. Seeds Complies with EU rules and standards, Origin U.K. bought from market in UK. At last we used SAS system for mean comparisons.

**Table 1: Treatment mixture dosages.**

| Treatments | Vermicomposting % | Peat % | Bone Meal | Poultry Fertilizer |
|---|---|---|---|---|
| 1 (A) | 0 | 100 | NO | NO |
| 2 (B) | 15 | 85 | NO | NO |
| 3 (C) | 30 | 70 | NO | NO |
| 4 (D) | 0 | 100 | YES | YES |
| 5 (E) | 15 | 85 | YES | YES |
| 6 (F) | 30 | 70 | YES | YES |
| 7 (G) | 0 | 100 | NO | YES |
| 8 (H) | 15 | 85 | NO | YES |
| 9 (I) | 30 | 70 | NO | YES |
| 10 (J) | 0 | 100 | YES | NO |
| 11 (K) | 15 | 85 | YES | NO |
| 12 (L) | 30 | 70 | YES | NO |

**Table 2: Nutrition elements of bed matters.**

| Matter | Potassium ($K_2O$) | Nitrogen (N) | Calcium (CaO) | Phosphorous ($P_2O_5$) | pH |
|---|---|---|---|---|---|
| Peat moss | 1.5 % | 0.9 % | 0 | 1.2 % | 5.7 |
| Vermi compost | 1.03 % | 2.21 % | 5.26 % | 2.12 % | 8.26 |
| Bone meal | 0 | 1.8 % | 29.1 % | 12.39% | 6.7 |
| Poultry fertilizer | 2.13 % | 3.6 % | 15.96 % | 0.43% | 6.55 |

## RESULT AND DISCUSSION

Studying on comparison of utilizing different doses of peat mass, vermi compost, bone meal, poultry fertilizer and their interactions made some significant differences and results according to below. Data analyses showed that none of mixtures had any significant effects on stem diagonal size factor.

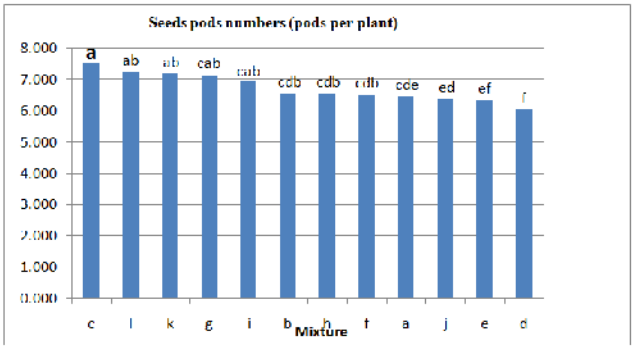


**Fig. 1.** Duncan's multiple ranges for plant's seeds pods numbers.

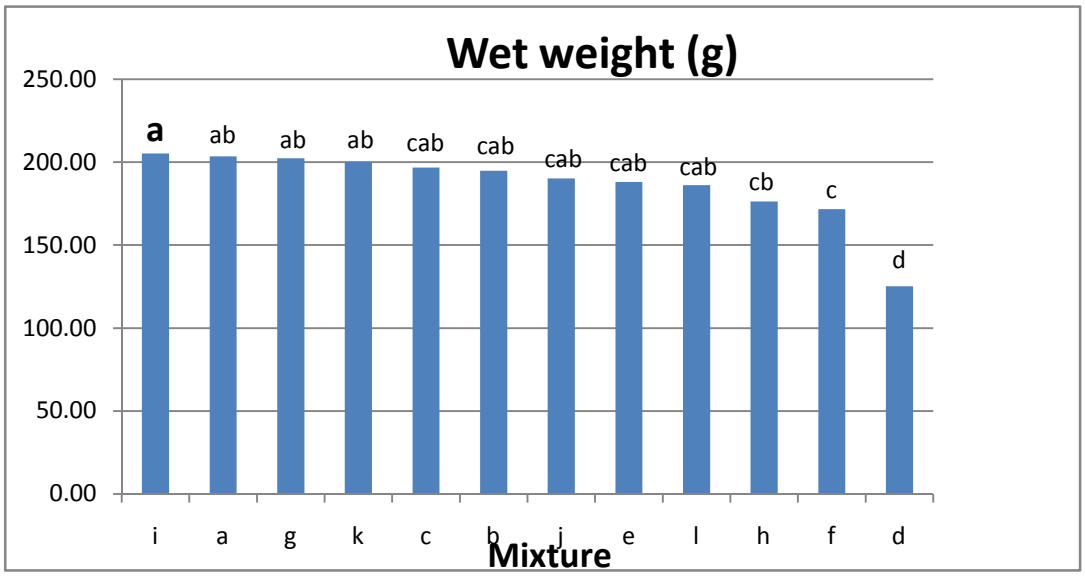


**Fig. 2.** Duncan's multiple ranges for wet weight.

Mixture C had significant effect on seeds pods numbers factor in level of 1%. And on the factor of wet weight data analyses showed that mixture I (peat moss + vermin compost + poultry fertilizer) had significant effect in level of 1%. According to results that showed a significant effect for mixture of vermi compost and poultry fertilizer in comparison to other mixtures that we can explain it as its nutritious elements such as Nitrogen that make plant able to having more water absorption. Also this research showed nitrogen's confirmed role in plant growth. In addition we found some nutrient effect of compounds utilized in beds that can separate better ones than others (Fig. 1,2 ).

## SUGGESTION

We suggest other appetent researchers to watercress facts that according to results working on other organic nitrogen sources will be reasonably.

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