



EFFECTS OF ORGANIC COMPOST DOSES AND REGULATED IRRIGATION ON GROWTH AND YIELD OF ORGANIC RED RAPID LETTUCE (*LACTUCA SATIVA L VAR. RED RAPIDS*)

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Abstract

Organic vegetables have gotten an increasing interest, but organic fertilizers and irrigation water used to produce them could be significant issues of economic calculation to be considered for some locations. This study was aimed to determine the optimum doses of organic compost and irrigation level for growing organic red lettuce in a greenhouse. Completely Random Design (CRD) coupled with factorial arrangement was implemented in this study. Treatments consisted of two factors; doses of organic compost (D) and regulated irrigation levels (I). The factor of doses included 0% (D0), 10% (D1), 30% (D2), and 50% (D3) organic compost of the total weight of the growth media (3 kg per pot). The factor of regulated irrigation levels included 40% (I1), 70% (I2), and 100% (I3) of available water. Three replicates were used, making total of 36 experimental units. Plants were cultivated in a greenhouse, using pots each of which contained 3 kg media, and watered regularly based on the treatments assigned. The data set was analyzed by using Analysis of Variance (ANOVA) and followed by least significant differences (LSD) at $\alpha = 5\%$. The result showed that interaction effect between organic compost doses and irrigation levels on the growth, yield, and water productivity of the red rapid lettuce was significant at $\alpha = 0.05$. However, the treatments were not significant on some chemical properties of the rapid red lettuce. The most optimum scheme was found to be the treatment combination between the organic compost dose of 300 g plant⁻¹ (D1) and the regulated irrigation level at 100% (I3) of available water.

Keywords: Keywords: available water, greenhouse, organic vegetable, water scarcity, water management

1. Introduction

Organic vegetables have gotten increasing public perceptions as clean, healthy, and hazardous chemical free produces. Organic vegetables refer to those, which are cultivated without the uses of chemical fertilizers and pesticides. The consumption of the fresh organic vegetables is perceived to be able to enhance the prevention of some of the health hazards associated with the consumption of conventional vegetables. This perception has encouraged consumers to consume organic vegetables even though they have to pay more. The more income households earn,

and the more consumers perceive a potential negative impact on health from pesticides usage, the more likely they would be willing to pay a premium for fresh organic produces.

Lettuce (*Lactuca sativa* L), has been known as originated from Eastern Mediterranean. Lettuce is one of the vegetables that is widely cultivated organically. Red rapid Lettuce (*Lactuca sativa* L var. red rapids) is one of leafy lettuces that is preferred and consumed in raw mostly as an ingredient of salads. One reason is that red rapid lettuce contains a lot of vitamins, minerals, anti-oxidant compounds, with exceptional abundance of anthocyanins (Baslam et al., 2013), in addition to its tasty flavour.

One major problem associated with organic farming is that the system requires a lot of organic fertilizers or composts. In addition to the huge volume, cost for purchasing compost is not cheap especially for small-scale farmers in many locations. Therefore, the uses of organic composts need to be calculated wisely when developing organic vegetable cultivations. Otherwise, the organic vegetable business becomes economically unfeasible and farmers may suffer losses, resulting in slow development of organic farming systems. Current researches were mostly to determine optimum doses and types of the organic composts (Reis et al., 2014). However, none of research studies was conducted on rapid red lettuce. Other major problem associated with organic farming is that this system needs to be supplied with adequate irrigation water, just like other general farming systems (Rosadi et al., 2019). Inadequate irrigation water may result in low yields, and eventually growers could suffer severe losses. Chala and Kokobe, (2015) applied full drip irrigation at 100% of water requirement and produced maximum yield of green lettuce.

The above researches mentioned were all about optimizations of fertilizers (either organic or inorganic) and irrigation water for head and or for green leafy lettuces. None of the research studies above investigated organic compost and irrigation water applications on rapid red lettuce. This study aims to optimize the dose of an organic compost and irrigation level applied for organic “red rapid” lettuce cultivation.

2. Objective and tasks of research

The main objectives of this research is to evaluate the effect of organic fertilizer and irrigation on red lettuce. In addition, the objective is to determine optimum dose of an organic compost and optimum amount of irrigation water applied for organic “red rapid” lettuce cultivation in pot experiment carried out in a green house.