

## Effect of Different Shade Levels on Growth and Yield Performance of Lettuce

Anusiya.M\*, Sivachandiran.S

Department of Agronomy, Faculty of Agriculture, University of Jaffna, Sri Lanka

**\*Corresponding Authors:** Anusiya.M, Department of Agronomy, Faculty of Agriculture, University of Jaffna, Sri Lanka

**Abstract:** An experiment was conducted during March to May in 2016 at integrated farm and training Centre, faculty of agriculture, university of Jaffna, Kanakarayan kulam to find out the performance of lettuce under different shade condition. The experiment for lettuce (*Lactuca sativa*) was laid out in RCBD with three different shade levels (0 %, 50 % and 75 %). Following treatments were used with three replicates. Evaluation was done based on the parameters of growth such as number of leaves and leaf area, yield and sensory attributes such as Color, Leaves stem appearances and Overall appearance of crop. The data were assessed through ANOVA test by using SAS computer software package for growth and yield parameters and Kruskal-Wallis test was performed for sensory assessment. Results indicate that significant increase in growth and yield of leafy lettuce was observed in the 50% shade level. Similar correlation which was observed in the sensory evaluation. Therefore, it can be concluded that growth and yield of lettuce was greatly influenced by 50 % shade level. Cultivation of Lettuce under 50% shade level will be more profitable in summer season.

**Keywords:** Growth, Lettuce, Sensory evaluation, Shade level, Yield

### 1. INTRODUCTION

Lettuce is popular leafy vegetable for its delicate, crisp texture and slightly bitter tang. Lettuce (*Lactuca sativa* var. Lores, variety Longifolia, Longifolia Group) is often associated with health benefits due to the presence of antioxidant components (María *et al.*, 2013). The nutritive value of lettuce very high but rests largely upon a good content of minerals and a moderate store of the vitamin to the human diet (Work, 1997).

Among Leafy green vegetables lettuce is popular one around the world and especially in Asia. . Cultivation of Lettuce is a profitable business for farmers in srilanka; however, these vegetables are highly perishable and need to be sold in the market within a few hours of harvest. In Sri Lanka recently the demand of leafy vegetables has increased due to increase consumer incomes and the widening of dietary diversity (Peiris *et al.*, 2015). Demand of lettuce could be achieved by increase the extent of cultivation, using of high yielding hybrid varieties and adaptation of improved cultivation practices. The cultivation of vegetables under protected houses improve their yield quantity and quality (Rajasekar *et al.*, 2013). The cultivation of vegetables under protected house could be used to improve yield quantity and quality (Singh *et al.*, 1999) & (Ganesan, 2004). Due to the above reasons, nowadays most of the farmers growing lettuce under protective structure, especially in large net houses. However profitability in protected cultivation depends on the choice of structure, selection of crop, and selection of varieties, production technology and market price.

Environment is the aggregate of all external conditions which influence growth and development of plants. Among environmental factors, the quality, quantity, periodicity and direction of light are important factors as signals to optimize the growth and development of lettuce.

### 2. MATERIALS AND METHODS

An experiment was conducted during March to May in 2016 at integrated farm and training Centre, faculty of agriculture, university of Jaffna, Kanakarayan kulam to find out the performance of lettuce under different shade condition. Variety of Rapido -344 was selected for this experiment. The

experiment was laid out in RCBD with three different shade levels (0 %, 50 % and 75 %) .Following treatments were used with three replicates.

Each treatment area was divided into 1.5m\*1m size to accommodate the treatments. Seeds of lettuce were sown at 30cm\*30cm spacing. Planting was done in the evening to avoid the wilting. After planting each plot of open field was covered with banana leaves until they germinate.

Each bed was kept Moist until plants established well. Basal Organic fertilizers application was done at the rate of 4kg per 1m2. Organic manure was applied 3-4 days before planting. There was no inorganic fertilizer application. Watering was done 2 times per day until they established well. Watering was done 2 times per day until they established well. Then watering was done once in a day. Hand Weeding was done weekly interval.

Parameters of growth, yield and sensory evaluation were done. About five plants were selected

Randomly and from which, all the growth and yield parameters were measured. Parameters of growth such as number of leaves and leaf area were recorded. Each plot was harvested separately and yield was recorded. Sensory evaluation test was done by prepared sensory evaluation card. Sensory panel had 20 consistence members who were invited to select suitable shade level for each leafy vegetable. Suitable shade level for each leafy vegetables was selected according their preference level based on hedonic scales were used. Sensory characters such as colour, leaves and stem based on the appearances of crop were evaluated for lettuce. Kruskal-Wallis test was performed for sensory assessment

### 3. RESULT AND DISCUSSION

The results obtained from this experiment indicate that there was significant variation in many vegetative growth traits and yield of leafy vegetables under different light intensity. Parameters such as leaf area, number of leaves and yield of lettuce were recorded from this experiment.

#### 3.1. Number of Leaves of Lettuce

**Table1.** Mean value of leaves number obtain from Lettuce

Treatment	Leaves per plant		
	2nd week	4thweek	6thweek
0%shade level	2.800±0 <sup>c</sup>	3.133±0.066 <sup>c</sup>	3.733±0.133 <sup>c</sup>
50%shade level	5.466±0.13 <sup>a</sup>	9.066±0.24 <sup>a</sup>	13.422±0.133 <sup>a</sup>
75%shade level	5.266±0.13 <sup>b</sup>	5.466±0.0667 <sup>b</sup>	10.533±0.17 <sup>b</sup>

#### Means with the Same Letter are not Significantly Different

Number of leaves was highest under shade net house in summer season compared to open field. This may be due to enhanced photosynthesis and respiration due to the favorable micro-climatic conditions in the shade net house .Number of leaves were significantly maximum in growing of lettuce in 50 per cent shade net. This might be due to the favorable effect 50 per cent shade net which had increased photosynthetic process in lettuce.

#### 3.2. Leaf Area

**Table2.** Mean value of leaves area obtain from Lettuce

Treatment	Leaf area		
	2nd week	4thweek	6thweek
0%shade level	8.46±0.75 <sup>c</sup>	14.22±0.8 <sup>c</sup>	28.26±1.02 <sup>c</sup>
50% shade level	88±0.91 <sup>a</sup>	145±1.03 <sup>a</sup>	195.85±2.06 <sup>a</sup>
75% shade level	65±0.89 <sup>b</sup>	120±1.21 <sup>b</sup>	163.36±2.02 <sup>b</sup>

#### Means with the Same Letter are not Significantly Different

Highest leaf area was observed in 50% shade level. Leaf area per plant was highest under shade net house compared to 0% shade level (open field). Leaf area was influenced by growing environment.

### 3.3. Yield

**Table3.** Mean Value of Yield Obtain from Lettuce

Treatment	Yield/kg
(0%shade) level	0.78±0.011 <sup>c</sup>
50% shade level	1.62±0.02 <sup>a</sup>
75% shade level	1.09±0.02 <sup>b</sup>

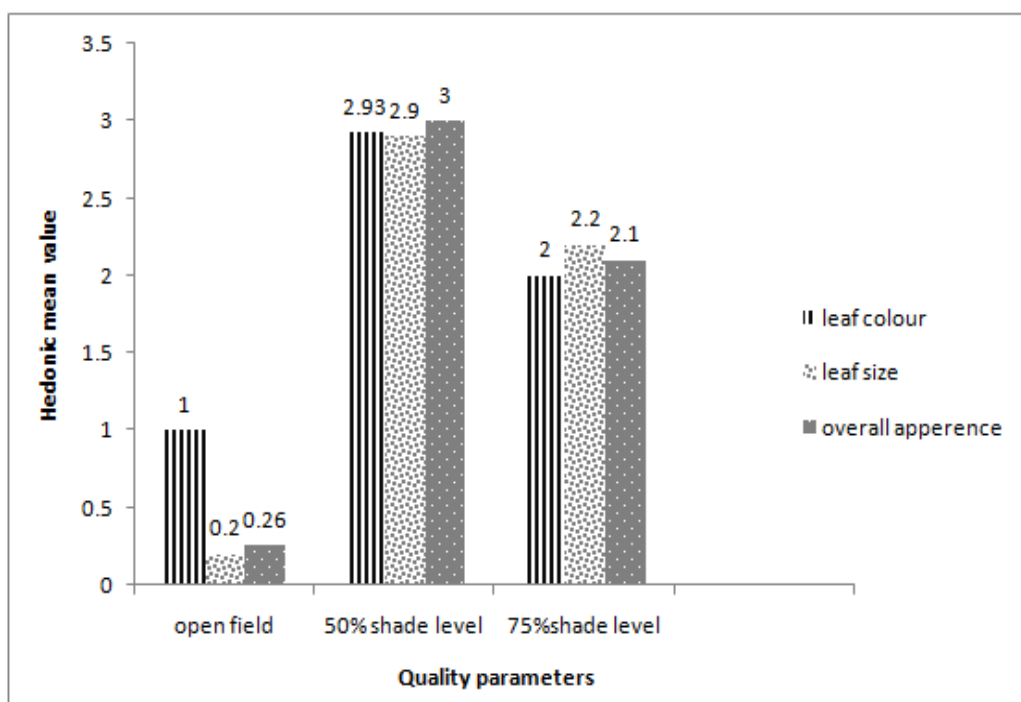
Means with the same letter are not significantly different

Highest yield was obtained in 50%shade level. This might be due to the favourable effect 50 per cent shade net which had increased photosynthetic process in lettuce

### Evaluation of Sensory Parameter

Visual is important quality parameter those decide the consumer preference. Visual examination by consumers was significantly important parameter that determine selection of suitable shade level for leafy vegetables cultivation. In leafy vegetables, leaf colour, stem appearance & overall crop appearance are important visual quality parameters those decides the consumer preference. Kruskal-Wallis test was performed for sensory assessment

### 3.4. Sensory Evaluation of Lettuce



#### Mean Value of Sensory Characters of Lettuce

Visual quality parameters such as Leaf colour, leaf size & overall appearance of lettuce showed Significant variation ( $p < 0.05$ ) among the treatments. High preference level for lettuce cultivation was observed in 50% shade level than 0% & 75% shade level.

From this sensory evaluation suitable shade level for lettuce cultivation is than 50% shade level than 0% shade level (open field) & 75% shade level. Visual appearance was significantly differed under different shade level because morphological features were different among treatments.

### 4. CONCLUSION

The result concluded that lettuce showed better performance when exposed to the 50% shade level than other shade levels. The lettuce grown in shade net situation favored plant growth attributes and gave higher production as compared to open field situation. Result of these investigations revealed that lettuce production significantly influenced by seasonality and weather conditions. Among various environmental factors, light is one of the most important variables affecting photosynthesis and its primary metabolites in lettuce. During summer season.

**REFERENCES**

- [1] Drost, D., Black, B. and Hunter, B., 2010. High Tunnel Lettuce in Utah.
- [2] Bandara, R.M.U.C., Perera, T.M.R.S., Balasuriya, B.L.H.N., Dabarera, R. and Beneragama, C.K., 2014. Effects of Different Colour Shade Nets on Growth and Development of Selected Horticultural Crop Species.
- [3] Ganesan, M., 2002. Effect of poly-greenhouse on plant micro climate and fruit yield of tomato. Karnataka journal of agricultural sciences, 15(4), pp.750-752.
- [4] Peiris, P.S.M. and Weligamage, P., 2015. A study on production practices and profitability of leafy vegetable farming in peri-Urban Colombo, Sri Lanka.
- [5] Rajasekar, M., Arumugam, T. and Kumar, S.R., 2013. Influence of weather and growing environment on vegetable growth and yield. Journal of Horticulture and Forestry, 5(10), pp.160-167.
- [6] Ganesan, M., 2002. Effect of poly-greenhouse on plant micro climate and fruit yield of tomato. Karnataka journal of agricultural sciences, 15(4), pp.750-752.

**Citation:** Anusiya.M, Sivachandiran.S, "Effect of Different Shade Levels on Growth and Yield Performance of Lettuce", *International Journal of Forestry and Horticulture (IJFH)*, vol. 5, no. 3, pp. 1-4, 2019. Available: DOI: <http://dx.doi.org/10.20431/2454-9487.0503001>

**Copyright:** © 2019 Authors. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.