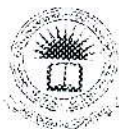


**EFFECT OF INORGANIC AND BIO FERTILIZER ON
GROWTH AND YIELD OF *Allium cepa* L.**



M A H L. Bandara



FAG833



Library,
Eastern University, Sri Lanka

**Faculty of Agriculture
Eastern University
Sri Lanka**

2019

ABSTRACT

A pot experiment was conducted in Pahalawewa Organic farm of Bio Foods (PVT) Ltd, Sri Lanka, during January to April of 2019 to investigate the effect of inorganic and bio fertilizer on growth & yield of *Allium cepa* L.

The experiment was conducted with four treatments in Completely Randomized Design with six replications. (T1: Eco Plus Liquid Bio Fertilizer, T2: Eco plus Solid Bio fertilizer, T3: Eco plus Liquid Bio fertilizer combined with Eco plus Solid Bio fertilizer, T4: Department Recommendation of the inorganic fertilizer) and also their performances on the growth and yield of *Allium cepa* L. were investigated. Eco plus liquid bio fertilizer was applied after 3 days, 1 month, 2 months after transplanting. The Eco plus Solid Bio fertilizer was applied at 3 days before transplanting to of *Allium cepa* L. Measurements were taken from the disruptive and non-disruptive sample while data analysis was done by SAS 9.4 (Dutch).

The maximum growth and yields were observed in T₃ and T₂ where the parameters of plant height, plant width, number of leaves, average fresh weight and dry weight of the leaves, average fresh weight of bulb, average dry weight of the bulb, height of the bulb, diameter of the bulb and yield did not showed any statistical different.

However, the economic analysis revealed that T₃ provide highest net return (Rs.1,209,548.00) than T₂ (Rs.815,803.00) per hectare and hence the treatment T₃ could be considered as best for the farmers to cultivate onion with the application of *Eco Plus Liquid Bio fertilizer* and *Eco Plus Solid Bio fertilizer* in combination.

TABLE OF CONTENT

CHAPTER 1.....	1
1.0 INTRODUCTION.....	1
CHAPTER 2.....	6
2.0 LITERATURE REVIEW.....	6
2.2 Origin & distribution of <i>Allium cepa</i> L.....	6
2.3 Taxonomy of <i>Allium cepa</i> L.....	7
2.3.1 Botany of crop	7
2.3.2 General use of <i>Allium cepa</i> L.....	9
2.3.2.2 Photochemistry of <i>Allium cepa</i> L.....	10
2.3.2.3 Pharmacological property of <i>Allium cepa</i> L.....	11
2.3.3 Physiology of onion.....	11
2.4 Agronomic requirement of <i>Allium cepa</i> L.....	12
2.4.1 Day length.....	12
2.4.2 Water & nutrient requirement.....	12
2.4.3 Temperature.....	13
2.4.4 Timing of lifting	13
2.5 Post harvesting factor affecting bulb quality.....	14
2.5.1 Storage environment.....	14
2.6 Big Onion production in the world.....	16
2.6.1 Extent and production in Sri Lanka of onion.....	16
2.7 Recommended varieties of onion in Sri Lanka.....	17
2.8 Onion Breeding.....	20
2.9 Onion response to the fertilizer.....	21
2.9.1 Response to inorganic fertilizer.....	21
2.9.2 Response to organic and bio fertilizer.....	22
2.10 Organic fertilizer.....	23
2.11 Bio fertilizer.....	26
2.11.1. Azotobacter.....	27

2.11.2. Diversity of <i>Azotobacter</i>	29
2.11.3. Distribution of <i>Azotobacter</i>	29
2.11.4. Molecular characterization.....	29
2.11.5. PGPR activities of <i>Azotobacter</i>	30
2.11.6 Vitamin produce by the <i>Azotobacter</i>	30
2.11.7 Amino acid produce by the <i>Azotobacter</i>	31
2.11.8 Plant growth hormone (IAA, GA).....	31
2.11.9 Indole acetic acid.....	31
2.11.10 Gibberellic Acid.....	32
2.11.11 Antifungal compound.....	32
2.11.12 HCN production by the <i>Azotobacter</i>	33
2.11.13 <i>Azotobacter</i> as Bio Fertilizer.....	34
2.12 <i>Bacillus</i> species.....	35
2.13 <i>Azospirillum</i> species.....	36
2.14 <i>Rhizobium</i> species.....	36
2.15 <i>Trichoderma</i> species.....	37
CHAPTER 3.....	39
3.1 Experimental site.....	39
3.2 Preparation of the polybags.....	39
3.3 Collection of the seed.....	39
3.4 Agronomic practices.....	40
3.4.1 Seeding.....	40
3.4.2 Transplanting.....	40
3.4.3 Irrigation.....	40
3.4.4 Fertilizer application.....	40
3.4.5 Weeding.....	42
3.4.6 Pest and disease management.....	42
3.5 Eco Plus Bio fertilizer.....	42
3.6 Treatment code and description.....	43
3.7 Treatment application of Liquid Bio Fertilizer.....	43

3.8 Application of solid bio fertilizer.....	43
3.8 Application of the combined solid and liquid bio fertilizer.....	44
3.9 Experimental design.....	44
3.9 Measurement.....	44
3.9.1 Collar region diameter.....	44
3.9.2 Leaf parameters.....	45
3.9.2.1 Leaf height.....	45
3.9.2.2 Number of leaves.....	45
3.9.2.4 Fresh weight of the leaves (g).....	45
3.9.2.5 Dry weight of the leaves (g).....	45
3.9.3 Yield parameters.....	45
3.9.3.1 Fresh weight of the bulb (g).....	45
3.9.3.2 Dry weight of the bulb (g).....	46
3.9.3.3 Diameter of the Bulb (cm).....	46
3.9.3.4 Bulb length (cm).....	46
3.10 Analysis of data.....	46
CHAPTER 4.....	47
4.0 RESULT & DISSCUSSION.....	47
4.1. Leaf Length.....	47
4.2. Collar Region Diameter (Plant Width).....	51
4.3. Number of Leaves.....	54
4.4. Fresh and Dry Weight of the Leaves.....	56
4.6. Fresh Weight and Dry Weight of the bulb.....	59
4.7. Length of the Bulb.....	61
4.8. Diameter of the bulb.....	63
4.9. Average yield.....	64
4.10. Benefit cost analysis for T1,T2,T3 and T4.....	66
CHAPTER 5.....	69
CONCLUSION.....	69
CHAPTER 6.....	70

SUGGESION.....	70
REFERENCES.....	71