

**OPTIMIZING IRRIGATION FREQUENCY FOR MAXIMIZING  
GROWTH AND YIELD OF RADISH (*Raphanus sativus* L.)  
PLANTS TREATED WITH COMPOST AND CHEMICAL  
FERTILIZERS AS BASAL APPLICATION**



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## ABSTRACT

This study investigated the effect of irrigation frequency on the growth and yield of radish plants under two different basal fertilizer treatments which were chemical fertilizer and compost. This experiment was carried out in the Faculty of Technology of the Eastern University, Sri Lanka to assess the potential of water interval and fertilizer use on radish cultivation and its growth and yield. It was carried out in a factorial complete randomized design with six treatments. Each treatment was replicated six times. The experiment was conducted with three irrigation intervals: daily, 2-day and 3-day irrigation intervals. The results showed that irrigation frequency significantly affected various growth parameters and yield components of radish plants. Compost-treated plants showed optimum results with irrigation at a 2-day interval and the highest values were obtained for the plant height ( $21.79 \pm 0.51$  cm), number of leaves (8) and leaf area ( $21.79 \pm 0.51$  cm<sup>2</sup>), fresh weight of the leaves ( $70.57 \pm 3.62$  g), dry weight of the leaves ( $8.99 \pm 0.32$  g), fresh weight of tuber ( $139.50 \pm 7.35$  g), dry weight of tuber ( $10.04 \pm 0.48$  g), tuber length ( $22.93 \pm 1.17$  g) and tuber girth ( $12.50 \pm 0.53$  cm) and yield ( $46.50 \pm 2.45$  t/ha). Similarly, chemically fertilized plants irrigated with an irrigation interval of 2 days resulted in the highest plant height ( $19.96 \pm 0.62$  cm), number of leaves (7), leaf area ( $19.96 \pm 0.62$  cm<sup>2</sup>), fresh weight of leaves ( $59.90 \pm 6.32$  g), dry weight of leaves ( $7.80 \pm 0.32$  g), fresh weight of tuber ( $113.22 \pm 6.13$  g), dry weight of tuber ( $7.32 \pm 0.60$  g), tuber length ( $19.65 \pm 0.91$  cm) and tuber girth ( $10.27 \pm 0.61$  cm) and yield ( $37.74 \pm 2.04$  t/ha). Statistical analyses confirmed significant effects of both fertilizer type and irrigation frequency on the measured parameters ( $P < 0.05$ ), with compost treatments generally higher than chemical fertilizer treatments. The findings of this research demonstrate the critical role of irrigation frequency in optimizing the growth and yield of radish plants. In particular, a 2-day irrigation interval system with compost and chemical fertilizer treatments is more effective in improving growth parameters and yield components. Compost-treated plants showed superior growth and high yields compared to chemical fertilizers under the same irrigation conditions. Thus, to maximize the productivity of radish plants, it is recommended to apply compost with an irrigation schedule of 2-day. Further research could further explore the underlying mechanisms that contribute to compost-treated plants' enhanced performance under optimal irrigation frequencies.

# TABLE OF CONTENT

DECLARATION.....	iii
DEDICATION .....	iv
ACKNOWLEDGEMENT .....	v
ABSTRACT .....	vi
TABLE OF CONTENT .....	vii
LIST OF TABLES .....	x
LIST OF FIGURES.....	xi
LIST OF PLATES .....	xii
LIST OF ABBREVIATION.....	xiii
CHAPTER 01 .....	1
INTRODUCTION .....	1
1.1 Background for the study .....	1
1.2 Objectives.....	4
1.2.1 General objective .....	4
1.2.2 Specific objective.....	4
CHAPTER 02 .....	5
LITERATURE REVIEW .....	5
2.1 Study plant .....	5
2.1.1 Radish ( <i>Raphanus sativus</i> L.) .....	5
2.1.2 Recommended varieties of radish .....	5
2.1.3 Scientific classification .....	6
2.1.4 Origin and distribution in the variety .....	6
2.1.5 Main use of radish.....	7
2.1.6 Nutritional value .....	7
2.1.7 Nutritional components of radish per 100 grams .....	8
2.1.8 Agronomic practices .....	9
2.1.8.1 Ecological requirement .....	9
2.1.8.2 Watering .....	9
2.1.9 Climatic requirement.....	9
2.1.10 Radish Cultivation in Sri Lanka.....	9
2.1.11 Current status of radish production in Sri Lanka .....	10
2.2 Irrigation and plant.....	10

2.2.1 Irrigation frequency.....	10
2.2.2 Irrigation scheduling .....	10
2.2.2.1 Factors Affecting Irrigation Scheduling.....	10
2.2.2.2 Component of irrigation scheduling .....	11
2.2.3 Irrigation regime .....	11
2.3 Fertilizer and plant .....	12
2.3.1 Integrated plant nutrient management.....	12
2.3.2 Effect of nitrogen on growth and yield of radish .....	12
2.3.3 Effect of phosphorus on growth and yield of radish .....	13
2.3.4 Effect of potassium on growth and yield of radish .....	13
2.3.5 Detrimental effect of inorganic fertilizer .....	13
2.3.6 Effect of micronutrients on the growth and yield of radish .....	14
2.4 Compost and crops.....	14
2.4.1 Compost marking.....	15
2.4.1.1 Factors affecting the composting process .....	15
2.4.2 Type of compost.....	15
2.4.3 Effect of Compost on Vegetable Crops.....	16
2.4.4 Advantages of organic fertilizer .....	16
2.4.5 Disadvantages of organic fertilizer .....	17
CHAPTER 03 .....	18
MATERIALS AND METHODOLOGY.....	18
3.1 Location .....	18
3.2 Climate .....	18
3.3 Variety used.....	18
3.4 Experiment .....	18
3.5 Experiment design.....	18
3.5.1 Treatments used in this experiment.....	19
3.6 Agronomy practices .....	20
3.6.1 Land preparation .....	20
3.6.2 Filling polybags.....	20
3.6.3 Planting of seeds .....	21
3.7 Cultural practice .....	21
3.7.1 Fertilizer application .....	21
3.7.2 Irrigations .....	21
3.7.3 Weeding.....	21

3.7.4 Pest Management .....	21
3.8 Parameters .....	21
3.8.1 Growth parameters .....	21
3.8.1.1 Plant height (cm) .....	21
3.8.1.2 Number of leaves .....	22
3.8.1.3 Leaf area (cm <sup>2</sup> ) .....	22
3.8.2 Yield parameters .....	22
3.8.2.1 Tuber length (cm) .....	22
3.8.2.2 Tuber girth (cm) .....	22
3.8.2.3 Fresh and dry weights of the tuber (g) .....	22
3.8.2.4 Fresh and dry weights of leaves (g) .....	22
3.8.2.5 Tuber yield (t/ha) .....	22
3.9 Statistical analysis .....	22
CHAPTER 04 .....	23
RESULTS AND DISCUSSION .....	23
4.1 Results .....	23
4.1.1 Plant height .....	23
4.1.2 Leaf traits .....	24
4.1.2.1 Number of Leaves .....	24
4.1.2.2 Leaf area .....	26
4.1.2.3 Fresh weight of leaves .....	27
4.1.2.4 Dry weight of leaves .....	29
4.1.3 Tuber traits .....	31
4.1.3.1 Tuber Length .....	31
4.1.3.2 Tuber girth .....	32
4.1.3.3 Fresh weight of tuber .....	34
4.1.3.4 Dry weight of tuber .....	35
4.1.4 Tuber yield .....	37
4.2 Discussion .....	38
CHAPTER 05 .....	42
CONCLUSION .....	42
5.1 Suggestion and recommendation .....	42
REFERENCES .....	44