

Assessing the Impact of Mulching techniques on Broccoli (*Brassica oleracea* var. *italica*) Growth and productivity: A Comparative Analysis

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Introduction

Broccoli, a significant crop, belongs to the Cruciferae family (*Brassica oleracea* var. *italica* L.). This highly nutritious crop, which is a flowering vegetable rich in antioxidants, vitamins, glucosinolates, and anticarcinogenic substances, is grown all over the world [1]. Broccoli leaves are an excellent source of carotenoids and vitamin A. Plant growth, development, and yield are greatly influenced by plant spacing. Wider spacing results in larger plants with more vigorous development and higher-quality food, while closer spacing hinders intercultural operations and increases competition among the plants for nutrients, air, and light. Weed is the main source of concern when growing broccoli. Mulching is a good technique because it can help with weed growth control, evaporation from the soil surface, shield the soil surface from negative influences, and enhance agricultural plant growth conditions [2]. Mulches serve as a surface barrier to prevent water from evaporating off the surface of the soil.

Aims and Objectives

- ❖ To evaluate the effects of different mulching techniques on the growth and development of broccoli (*Brassica oleracea* var. *italica*).
- ❖ To compare the productivity (yield) of broccoli under various mulching practices and determine the most effective mulching method for enhancing crop performance.

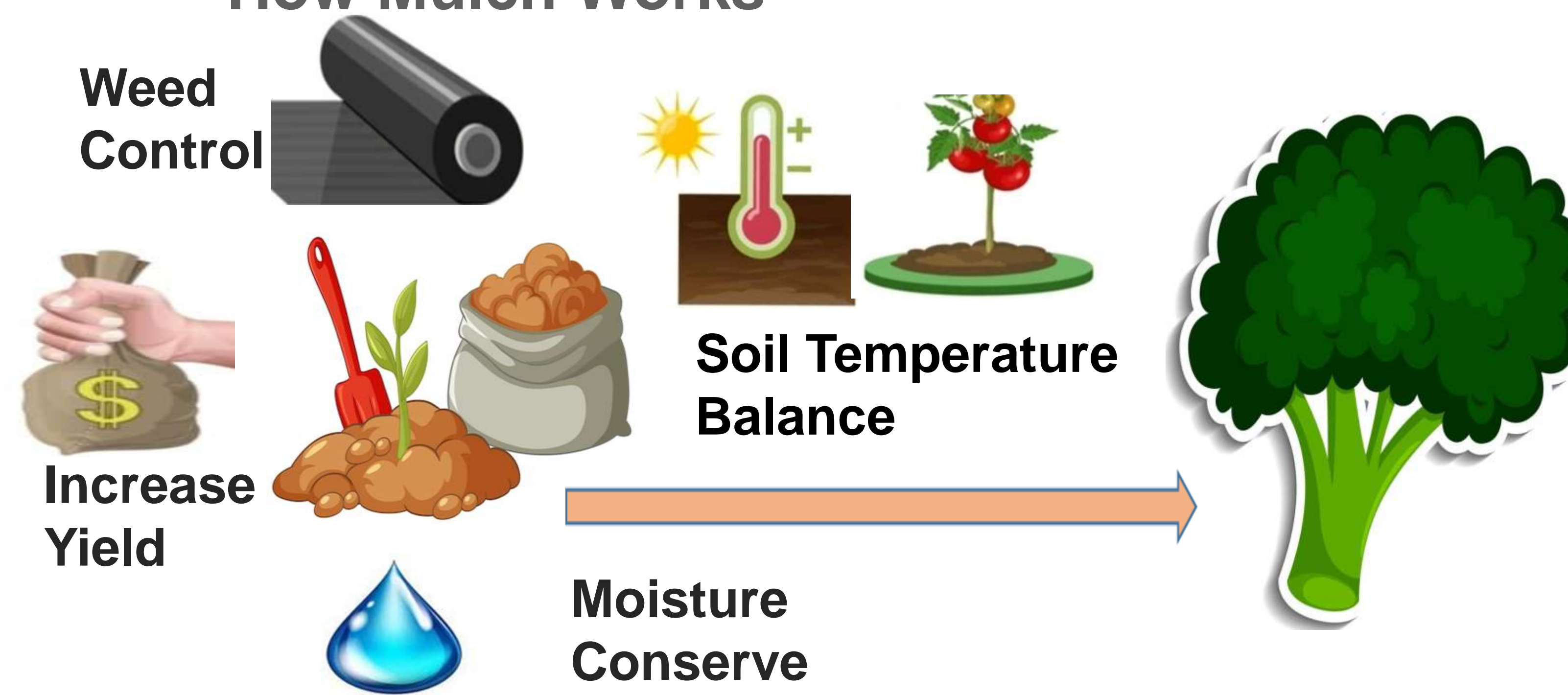
Material and Methods

The experimental area is located at (Latitude: 30° 11'N, Longitude: 71° 28'E), Multan, Punjab, Pakistan. Seeds of variety (Italica) were obtained from the local market of Vehari. The experiment was set up with three different amounts of mulching: straw mulch, black plastic mulch, control (no mulch), and one type of broccoli (Palam Smruddhi). It had three replications and a randomized block design. A 1-meter-wide by 15-20-cm-tall nursery bed was set up. Thinly spaced seeds were sown 0.5 cm deep and 10 cm apart. When seedlings reached a height of 12 to 15 cm, they were prepared for transplanting.

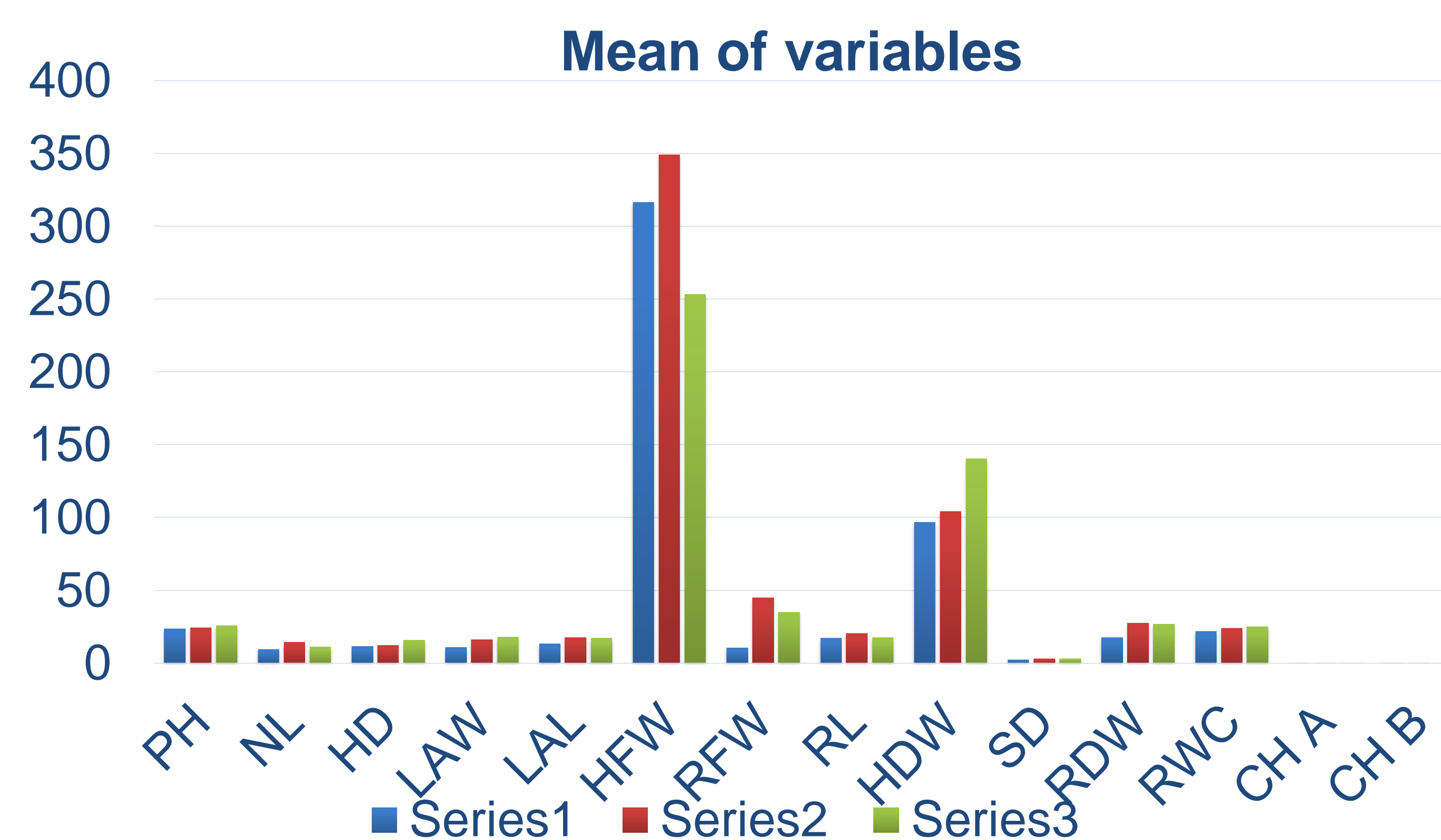
Conclusion

Consistent with previous results, the application of mulch materials increased broccoli growth and yield in this experiment as well as compared to no mulch control treatments. At BZU Multan, black plastic mulch is thought to be the best mulch in terms of broccoli growth and productivity. However, because they decompose quickly and perform better than leaving the ground untreated, organic mulches can be used as environmentally acceptable mulching materials.

How Mulch Works



Results



Three treatments (T_0 no mulch, T_1 black plastic mulch, and T_2 straw mulch) and five replications made up the Randomized Complete Block Design (RCBD) field layout. All growth and yield parameters showed significant differences, with the exception of stem diameter and chlorophyll. Treatment T_2 showed the highest plant height (25.6cm), head diameter (15.8cm), leaf area breadth (17.7cm), head dry weight (140.24g), and stem diameter (3cm) in the study. In Treatment T_1 , the following parameters reach their maximum: number of leaves, head fresh weight, root fresh weight, root dry weight, and root length. All other parameters have minimal values in Treatment T_0 , with the exception of head fresh weight. All things considered, the control therapy did the worst. The results of this experiment indicate that, black plastic mulch is thought to be the best mulch in terms of broccoli growth and productivity.

Future Prospects

As climate change leads to more erratic weather patterns, mulching can help mitigate these stressors by regulating soil temperature and moisture levels. Research into mulching's role in enhancing crop resilience will be crucial for adapting farming practices to changing climates.

References

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