

Evaluation of the Effect of Spatial Arrangement of Two Companion Crops on the Yield of Onion (*Allium cepa* L.) in Jaffna District of Sri Lanka

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Onion (*Allium cepa* L.) is one of the main cash crops cultivated in the dry zone of Sri Lanka, including the Jaffna district where it holds significant agricultural importance. However, onion cultivation faces low productivity due to intensive monocropping, pest prevalence, weed problems, and high production costs. Intercropping provides a potential pathway for a sustainable agriculture system by improving yield with the effective use of resources through crop diversification. Thus, a field study was conducted in a farmer's field, Achchuvely, Jaffna district, Sri Lanka, to assess the impact of intercropping onion with two companion crops under different spatial arrangements. The experiment was laid out in the factorial randomized complete block design with two factors and three replicates. The treatments were two companion crops (radish and beetroot) and three spatial arrangements (monocropping, intercropping of single row onion with single row companion crop, intercropping of double row onion with double row companion crop). Plant growth parameters such as plant height, number of leaves, and yield parameters such as number of bulbs per cluster, bulb index, weight of cluster per plant, bulb mass, and yield were recorded. The collected data were analyzed using the SAS statistical package. The results revealed that among the spatial arrangements, the double-row pattern significantly ($p < 0.05$) increased the number of bulbs per cluster (6.64), weight of cluster per plant (39.63 g), and bulb yield (29.62 tons/ha) than monocropping and single-row intercropping. Among the companion crops, intercropping of onion with radish recorded significantly the highest number of bulbs per cluster (6.27), weight of cluster per plant (37.19 g), bulb mass (6.2g), and the yield (26.62 tons/ha). The land equivalent ratio was 1.21 for onion intercropped with radish at a double-row planting pattern. It indicated that intercropping performed better than monocropping. It can be concluded that the intercropping of onion with radish using a double row intercropping pattern could be advised since it improves the yield and land utilization.

Keywords: Intercropping, Land equivalent ratio, Onion, Spatial arrangements, Yield parameters