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with planetary health"

Performance of lettuce (*Lactuca sativa* L.) under different shading levels in Sant-Louis, Senegal

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Abstract

Climate change with its consequences of increasing temperatures, solar radiation, and evapo-transpiration can negatively influence vegetable growth, yield, and quality, particularly in hot tropical regions. Integrating vegetables into agroforestry systems could be a solution, but no data on such systems are available in Senegal. Shade nets, which imitate shade of trees, can be tested as a mitigation method and for assessing species-specific responses to the prevailing microclimatic conditions under shade. The objective of this study was to assess the effects of different shading levels on agronomic performance of lettuce (*Lactuca sativa* L.). The experiment was conducted at the experimental farm of Gaston Berger University in Saint-Louis, Senegal, using shade nets with three different shading levels. The experimental design adopted was a completely randomised block design with three replications. The treatments used were: 0 % (no shade), 35 % shade, 55 % shade and 75 % shade. Total biomass (including roots), above-ground biomass and marketable yield (old/damaged outer leaves removed) were assessed from six plants per plot. Data were processed using analysis of variance and post-hoc Tukey test. The results showed that shade level had a significant effect on total biomass ($p = 0.017$), above-ground biomass ($p = 0.015$), and marketable yield ($p = 0.004$). Lettuce grown under the 55 % shade net showed the best performance with high average total biomass (145 g), above-ground biomass (134 g) and marketable yield (126 g) per plant. Lettuce cultivated in full sun (0 % shading) showed poor performance with lowest results for the above mentioned parameters (68 g, 58 g and 46 g, respectively). Lettuce grown under the 35 % and the 75 % shade nets showed medium performance with intermediate values for the assessed three variables. Our results suggest that intermediate shading levels in lettuce production systems could be a practical and efficient strategy for improving lettuce productivity in regions exposed to high heat stress. Further tests of lettuce production under the shade of trees should be performed to find out if lettuce is a suitable vegetable species for integration into agroforestry systems.

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