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Full Length Research Paper

Response of cabbage to depth of transplanting, soil amendment and water stress on a Japanese volcanic ash soil

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Abstract

Transplants growth may be reduced by environmental factors when appropriate cultural practices are not used. We studied the response of cabbage to depth of transplanting (DT), soil amendment (SA) and water stress (WS) in a volcanic ash soil at the National Agriculture Research Center in Tsukuba Science City, Japan. Two separate experiments were conducted during a six weeks period: in field and in container. Soil amendments consisted of chemical fertilizer (CF) applied as N-P₂O₅-K₂O 14-14-14 at the rate of 143 kg ha⁻¹, no fertilizer (NF) and dried animal manure (AM) applied at the rate of 1111 kg ha⁻¹. An additional treatment for the container experiment consisted of a soil subjected to four years application of animal manure + CF (CAM). Water stress consisted in one (WS₁) and three (WS₂) irrigations per week in the field, and the same irrigation schedule per two weeks in containers. Cabbage was transplanted in three distinct phases: at the top of the root ball (DT₀), the depth of cotyledon leaves (DT₁) and the first true leaf (DT₂). After six of field growth, cabbage total dry mass (TDM) decreased by 43, 39 and 33% in AM, CF and NF respectively when WS₂ was imposed. These results were also confirmed in container study. Animal manure was effective in reducing the severity of the suppressive effect of DT, but not that of WS on cabbage growth. Increase in cabbage overall

growth, which was higher in CF and CAM as compared to AM and NF, was mainly due to nutrient supply.

Key words: Animal manure, chemical fertilizer, cabbage growth, transplants

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