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# Soil Application of Mg, Zn and Mn: Effects on Growth, Nutrient Content and Soil Fertility Status of Large Cardamom in North East, India

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**Abstract—***Field experiment was conducted at Kabi Research Farm, Indian Cardamom Research Institute, RRS, Spices Board Gangtok, India to find out the role of soil application of Mg, Zn and Mn on growth and nutrition in large cardamom. The experiment laid out in randomized block design, consisted eight treatments viz. $ZnSO_4$ (5 kg/ha), $ZnSO_4$ (10 kg/ha), $MnSO_4$ (10 kg/ha), $MnSO_4$ (5 kg/ha), $MgSO_4$ (10 kg/ha), $MgSO_4$ (5 kg/ha), $ZnSO_4$ + $MnSO_4$ + $MgSO_4$ (10 kg/ha) and control. Result showed that among the fertility treatments, soil application of $ZnSO_4$+$MnSO_4$+$MgSO_4$@10kg/ha resulted in maximum number of immature tillers (4.10 and 4.80), mature tillers (4.48 and 4.20) during September, 2014 and March, 2015 and vegetative buds (3.05) of large cardamom. With respect to nutrients status in large cardamom, application $ZnSO_4$+$MnSO_4$+$MgSO_4$@10kg/ha had significantly higher Mg (0.54%), Zn (55.01 ppm) and Mn (493.60) content in leaf over the control. Change in soil fertility status due to treatment application were noticed at the end of experiment, among the different treatments, application of $ZnSO_4$ + $MnSO_4$ + $MgSO_4$@10 kg/ha proved its superiority over the others and its effect was statistically non-significant on available Fe and B in soil. Soil application of $ZnSO_4$+$MnSO_4$+$MgSO_4$@10kg/ha recorded the significantly higher Mg (49.03 ppm), Zn (4.20 ppm) and Mn (20.10 ppm) content in soil.*

**Keywords***: Large cardamom, Mg, Mn, Soil application and Zn.*