

EVALUATION OF CUTTING TECHNIQUES FOR OPTIMIZING ROOTING AND BRANCHING IN BLACK PEPPER (*Piper nigrum* L.) PROPAGATION

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Black pepper, known as the ‘King of spices’, is a commercially significant spice crop. Current propagation methods primarily use cuttings from top shoots or ground runners. Top shoot cuttings produce more roots and lateral branches, yet require more resources and maintenance. In contrast, ground runner cuttings are cost-effective but exhibit slow growth. A study was conducted at the Central Research Station, *Matale* from June to November 2024, to improve the propagation efficiency of ground runner cuttings by evaluating five different cutting techniques. A completely randomized design (CRD) with three replications was used to evaluate five cutting types (T1: top cutting, T2: single nodal cutting, T3: double nodal cutting, T4: two-stick single nodal cutting, T5: two-stick double nodal cutting) across 15 experimental units, with a total of 750 plants. Data were analyzed using ANOVA, with mean comparisons by Tukey’s test ($\alpha=0.05$). T5 showed the highest significant ($p<0.05$) increase in fresh (4.6 ± 0.56 g plant⁻¹) and dry (0.53 ± 0.02 g plant⁻¹) leaf biomass. The highest ($p<0.05$) increment in fresh (17.95 ± 1.31 g plant⁻¹) and dry (4.79 ± 0.21 g plant⁻¹) stem biomass was shown by T1. The exceptional rooting characteristics, including significantly higher ($p<0.05$) fresh root biomass (2.33 ± 0.65 g plant⁻¹) and the longest root increment (33.22 ± 1.56 cm) were exhibited by T5. In addition, a significantly higher ($p<0.05$) increment of number of leaves (2.67 ± 0.37) and the highest number of total secondary roots were recorded in T5. Although T1 and T5 demonstrated better overall propagation efficiency, T5 was the most cost-effective with a lower input cost (LKR 52.00 per cutting) compared to T1 (LKR 66.00 per cutting). In conclusion, T5 proved efficient for commercial black pepper propagation by optimizing resources, reducing costs, and enhancing growth, highlighting the potential of ground runner cuttings for cost-effective, large-scale adoption to improve yield and economic returns.

Keywords: Ground runners, Top cuttings, Two-stick double nodal cuttings, Two-stick single nodal cuttings