

Effect of gliricidia green manure on soil chemical properties of pepper growing soils in wet and intermediate zone of Sri Lanka

Black pepper (*Piper nigrum* L.) is the second most important export agricultural crop extensively grown throughout the wet and intermediate agroclimatic zones in Sri Lanka. Two field experiments were established at Ethulgama in mid country wetzone (WM3) and Wasanagama in mid country intermediate zone (IM1) of Sri Lanka to evaluate the effect of two rates (10 and 15 kg/plant/year) of gliricidia green manure with zero, half or full doze of recommended level of inorganic fertilizer (200N, 160P₂O₅, 200K₂O and 14 MgO g/plant/year) on soil chemical properties of pepper growing soils. Application of 15kg of gliricidia loppings with zero level of inorganic fertilizer improved soil organic matter (4.20%) significantly over the control (2.17%) at Ethulgama site. At Wasanagama site a significant treatment effect on soil organic carbon was observed in 15 kg of gliricidia loppings with half doze of recommended amount of inorganic fertilizer (1.59%) while in control it was only 0.99%. Highest total nitrogen content (0.35%) at Ethulgama site was observed with application of 10 kg gliricidia alone, while in control it was only 0.29%. At Wasanagama site highest total N% of 0.36 was observed with application of 15 kg of gliricidia with full doze of inorganic fertilizer which was significantly different from the control (0.18%). Application of 15 kg of gliricidia with full recommended doze of fertilizer gave 17.70 ppm of available P at Ethulgama site which was significantly higher over the control (1.77 ppm). At Wasanagama site application of 10 kg gliricidia green manure with full doze of inorganic fertilizer gave significantly higher available P content (14.02 ppm) over the control (6.62 ppm). At Ethulgama site treatment of 15 kg of green manure with half of inorganic fertilizer showed significantly higher soil exchangeable potassium content (609.1 mg/kg) compared to the control (60.1 mg/kg). Soil treated with 15 kg with full doze of fertilizer gave the significantly highest soil exchangeable K (867 mg/kg) while in control it was only 246 mg/kg at Wasanagama site. Highest soil exchangeable Mg content of 391mg/kg was recorded with application of 10 kg green manure with full doze of inorganic fertilizer. At Ethulgama site highest soil exchangeable Mg content of 438 mg/kg was recorded with application of 15 kg green manure with full doze of inorganic fertilizer , while in control it was 96 mg/kg. The results suggest that the increase of application of green manure from 10 to 15 kg, improve the soil nutrient further and that is a limitation of supplying green manure at intermediate conditions but not in wet agro climatic conditions.