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## Growing Cover Crops to Improve Biomass Accumulation and Carbon Sequestration: A Phytotron Study

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### ABSTRACT

Cover crop system has shown a potential approach to improving carbon sequestration and environmental quality. Six of each winter and summer cover crops were subsequently grown in two soils, Krome gravelly loam soil (KGL), and Quincy fine sandy soil (QFS), in phytotrons at 3 temperatures (10/20, 15/25, 25/30oC for winter/summer cover crops) to investigate their contributions for carbon (C) sequestration. Among winter cover crops, the highest and the lowest amounts of C accumulated were by bellbean (*Vicia faba* L.), 597 g/m<sup>2</sup> and white clover (*Trifolium repens*), 149 g/m<sup>2</sup>, respectively, in the QFS soil. Among summer cover crops, sunn hemp (*Crotalaria juncea* L.) accumulated the largest quantity of C (481 g/m<sup>2</sup>), while that by castorbean (*Ricinus communis*) was 102 g/m<sup>2</sup> at 30oC in the KGL soil. The mean net C remained in the residues following the 127 d decomposition were 187 g/m<sup>2</sup> of C (73% of the total) and 91 g/m<sup>2</sup> (52% of the total) for the winter and summer cover crops, respectively. Following a whole cycle of winter and summer cover crops grown, the mean soil organic C (SOC) increased by 13.8 and 39.1% in the KGL and QFS soil, respectively, compared to the respective soils before. The results suggest that triticale, ryegrass, and bellbean are the promising winter cover crops in the QFS soil, while sunn hemp, velvetbean (*Mucuna pruriens*), and sorghum sudangrass (*Sorghum bicolor* × *S. bicolor*) are recommended summer cover crops for both soils under favorable temperatures.

### KEYWORDS

Carbon to Nitrogen Ratio (C:N), Greenhouse Gas (GHG), Krome Gravelly Loam (KGL), Quincy Fine Sand (QFS), Soil Organic Carbon (SOC)

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