Indian Journal of Ecology (2020) 47(1): 123-128

Manuscript Number: 2970
NAAS Rating: 4.96

Validation of Carbon Contents in Different Traits and Components of Herbaceous Species from Tropical Grassland

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Abstract: Because of global climate change events; the quantification of carbon (C) present in different species from diverse ecosystems are urgently needed. Study evaluated the performances of different methods used for the C estimation in different plant components and traits by comparing with harvest method. For this, 117 herbaceous species just-before flowering were harvested from the campus of Banaras Hindu University, Varanasi. Across the components, the mean C contents (g plant^{-1}) varied between 0.33 for roots of procumbent and 7.93 for shoots of native trait categories. On g m^{-2} basis, it ranged from 29 (roots) to 85 (shoots). Similarly across the components, the mean C: B ratio ranged between 0.41 (roots) and 0.44 (shoots). The linear relationship between C and B had high correlation coefficient, low standard error of estimate together with low discrepancy in extrapolation compared to the other models. Hence, compared to other models, the linear equation could be used in C estimation. Further among all the estimators; at the species, component and functional group levels, the mean C: B (0.43) ratio of the entire herbaceous species resulted as an accurate estimator of the C. Because of its simplicity and low discrepancy, the mean C: B (0.43) ratio seems to be reasonable to estimate the C content based on the known biomass. Stems of perennials, erects, leguminous and native plants had greater C than the others. Thus, the perennial, erect, leguminous and native herbaceous species could be an alternative for reducing the atmospheric C in the tropical grasslands.

***Keywords*:** Carbon estimator, C:B ratio, Climate change, Herbaceous species, Non-destructive, Regression, Tropical grassland