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Soil characterization, the natural vegetation and their inter-relations is desirable for proper watershed management. Multivariate differentiation of three topographic positions by analysing soil properties, grass, shrub and tree species in 96 quadrats of a 75 ha sub-watershed located at village Bunga-in Ambala Shiwalik foothills, was performed. Overall aboveground biomass of grasses was 3.6 times more than the standing biomass of shrubs. Aboveground biomass of grasses and basal area of trees was highest in the toe (valley) position and was found to be quite distinct from the other two topographic locations by discriminant analysis. Soil phosphorus, pH, *Butea monosperma, Acacia leucophloea* and miscellaneous grasses were important discriminators of the topographic differentiation. Soil organic carbon had positive correlation and potassium negative with discriminant function scores of all grass species. Grass species were significantly positively and negatively correlated with the combined effect of trees and shrubs, respectively. Implications of these results in the watershed management and soil erosion prediction models are discussed.