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Research Article

Morphological, physical and chemical properties of arid soils of Bathinda district of Punjab

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Summary

Morphological, physical and chemical characteristics of soils developed on three physiographic units (sand dunes, interdunal areas and alluvial terraces) in Bathinda district in the arid zone of Punjab have been investigated. The soils developed on sand dunes were coarser in texture (silt content varies from 2.0 to 16.0 1per cent while clay content varies from 2.8 to 8.9 per cent), lack subsurface diagnostic horizons and do not show structural development. Soils developed on interdunal terraces were yellowish brown in colour in the surface and dark yellowish brown in lower horizons and were relatively fine textured (silt content varies from 9.4 to 14.5 and clay content varies from 7.2 to 13.5 per cent) alongwith development of a structural B horizon. The alluvial terrace soils were fine textured (silt content varies from 8.6 to 22.5 and clay content 16.4 to 23.7 per cent), dark yellowish brown in colour throughout the profile and soil structure varies from weak fine sub- angular blocky to massive. Soil bulk density varies from 1.40 to 1.61 Mg m^{-3} in sand dune, 1.42 to 1.66 Mg m^{-3} in interdunal and 1.49 to 1.72 Mg m^{-3} in alluvial terrace soils. Available volumetric water content varies from 9.3 to 15.7 per cent in sand dune soils, 10.6 to 16.2 per cent in interdunal area soils and 16.09 to 26.3 per cent in alluvial terrace soils. Saturated hydraulic conductivity varies from 1.80 to 3.36, 0.7 to 1.91 and 0.32 to 0.89 cm h^{-1} in sand dunal, interdunal and alluvial terrace soils, respectively. Initial infiltration rate was 0.36, 0.176 and 0.125 cm min^{-1} in sand dunal, interdunal and alluvial terrace soils, respectively with corresponding final (steady state) infiltration rate 0.18, 0.065 and 0.04 cm min^{-1}. The fine textured alluvial terrace soils have the highest cation exchange capacity (weighted mean 8.44 Cmol kg^{-1}) followed by interdunal (weighted mean 6.41 Cmol kg^{-1}) and sand dunal soils (weighted mean 4.97 Cmol kg^{-1}).

Key words : Morphological, Physical and chemical properties, Arid soils

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