

Short Communication

Physico-chemical Characteristics of some Dry Temperate Zone Soils of Himachal Pradesh

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The Lahaul valley lies in the dry temperate region of Himachal Pradesh. It is well known for producing a number of high value cash crops, viz., *Saussuria lappa* (kuth), *Solanum tuberosum* (potato), *Humulus lupulus* (hops) and off-season *Pisum sativum* (peas). Adoption of sound nutrient management programme is one of the measures to boost production of these crops. A first hand information on physico-chemical characteristics is a prerequisite for formulation of such a programme. However, no such information is available for these soils. The present study is an effort in this direction.

The Lahaul valley is divided into five sub-valleys, viz., Pattan, Ghar, Tinan, Miari and Tindi.

Fifty two surface soil samples (0-15 cm) were collected from these sub-valleys and analysed as per the procedures outlined by Black (1965) and Page (1982).

The soils are coarse textured, loamy sand or sandy loam and neutral in reaction (pH 6.5-7.6). The organic carbon content of the soils is very high due to (a) very high addition of organic manures, the common sources being FYM and night soil, and (b) their slow rate of decomposition, as the average summer temperature is around 18°C. The average values of organic carbon content are 1.61 ± 0.81 , 1.63 ± 0.07 , 1.66 ± 0.07 , 1.64 ± 0.05 and 1.62 per cent for Pattan, Ghar,

Table 1 Physico-chemical characteristics of soils

Soil property	Pattan 27 ^a	Ghar 6	Tinan 7	Miari 11	Tindi 1	Lahaul valley 52
pH	6.6-7.4	6.9-7.5	6.5-7.3	7.1-7.6	7.4	6.5-7.6
OC(%)	1.24-1.80 (1.61±0.81) ^b	1.58-1.77 (1.63±0.07)	1.53-1.75 (1.66±0.07)	1.55-1.74 (1.64±0.05)	1.62	1.24-1.77 (1.62±0.09)
Available nutrients (kg ha ⁻¹)						
N	201.6-470.4 (367.8±67.5)	313.6-425.6 (392.0±41.9)	380.8-470.4 (406.4±32.8)	313.6-448.0 (395.0±49.4)	38.4	201.6-407.4 (381.4±57.9)
P	19.0-37.0 (26.1±4.8)	14.0-30.0 (22.2±6.0)	18.0-37.0 (27.1±6.3)	15.0-40.0 (25.3±7.1)	26.0	14.0-40.0 (25.6±5.6)
K	112.0-420.0 (212.1±88.1)	140.0-393.0 (227.4±100.9)	134.0-364.0 (251.1±88.3)	67.2-302.4 (148.8±83.2)	224.0	67.0-420.0 (205.9±91.0)
Exchangeable Ca (cmol (P ⁺) kg ⁻¹)	4.0-10.5 (7.1±1.7)	4.5-9.0 (6.3±1.9)	4.5-10.5 (7.2±2.4)	5.0-9.2 (6.9±1.5)	6.0	4.0-10.5 (7.0±1.8)
Exchangeable Mg (cmol (P ⁺) kg ⁻¹)	1.0-4.5 (2.6±1.0)	1.5-4.0 (2.8±0.9)	1.0-3.5 (2.3±0.9)	1.5-4.0 (2.9±0.8)	2.5	1.0-4.5 (2.6±0.9)
WHC (%)	39.5-46.2 (42.8±2.0)	39.7-46.5 (43.4±2.6)	41.5±44.7 (42.7±1.0)	40.5-45.7 (42.6±2.1)	41.5	39.4-46.5 (42.8±2.0)
Textural class	ls-sl	ls-sl	ls-sl	ls-sl	sl	ls-sl

a - number of soil samples, b - mean value alongwith standard deviation

Tinan, Miar and Tindi soils, respectively, $1.62 \pm 0.09\%$ for the Lahaul valley soils (Table 1).

The available N content is 367.8 ± 67.5 , 392.0 ± 41.9 , 406.4 ± 32.8 , 395.0 ± 49.4 and 38.4 kg ha^{-1} for Pattan, Ghar, Tinan, Miar and Tindi soils, respectively, and $381.4 \pm 57.9 \text{ kg ha}^{-1}$ for the whole of Lahaul valley. In other words, the soils are medium in available N content. The soils are very high in available P content, the average being 26.1 ± 4.8 , 22.2 ± 6.0 , 27.1 ± 6.3 , 25.3 ± 7.1 and 26.0 kg ha^{-1} for Pattan, Ghar, Tinan, Miar and Tindi soils, respectively, with $25.6 \pm 5.6 \text{ kg ha}^{-1}$ as the mean value for all the samples. The mean values of the exchangeable K for the soils of these subvalleys are 212.1 ± 88.1 , 227.4 ± 100.9 , 251.2 ± 88.3 , 148.8 ± 83.2 and 224.0 kg ha^{-1} , respectively. The soils of Minar subvalley

were comparatively poor in their exchangeable K content and require special attention towards K fertilization for boosting production potential of the cash crops grown in the area.

The exchangeable Ca and Mg contents in the soils are sufficiently high, the mean values being 7.0 ± 1.8 and $2.6 \pm 0.9 \text{ cmol (P}^+) \text{ kg}^{-1}$, respectively. The soils show good water holding capacity (WHC) despite their coarse texture, probably because of high organic matter. The mean value of WHC for the soils is $42.8 \pm 2.0\%$.

References

- Black CA 1965 *Methods of Soil Analysis*. Part I, American Society of Agronomy, Madison, Wisconsin, USA
Page AL 1982 *Methods of Soil Analysis*. Part 2, Second Edition, ASA, SSSA, Madison, Wisconsin, USA