

NOTE

Physico-chemical Characteristics of the Soils of the Ram Nagar Region of Uttaranchal (India)

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Organic carbon and organic matter contents in the soils of Ram Nagar region of Uttaranchal (India) were estimated. The results have been discussed.

Key Words: Physico-chemical, Soil, Organic carbon, Organic matter

The organic matter of the soil undergoes continuous physical and chemical changes as a result of decomposition and mineralization process. CO₂, H₂O nutrients; inorganic and organic acids are produced as a result of these physical and chemical changes. Organic matter contents in mineral soils of warm humid regions are relatively small. Mineral soils contain 20% organic matter and 80% mineral matter on the basis of mass. On a volume basis, fertile loamy topsoil has average organic content of only 5%; in less fertile soils and in subsoils, the organic matter content is lower than 5% by volume. Generally, the soils with comparatively higher organic matter content are considered more fertile than the soils which are low in organic matter content.

Organic matter also increases the water holding capacity of soils and promotes the development of stable soil structures by increasing granulation. In the present paper, ten sites of Ram Nagar region were selected for the analysis of the organic contents in soil.

Selection of the representative soil from the ten selected site is made such that it satisfies all the conditions/norms prescribed by Cline^{1, 2}. The shaded portions and the portion of the land at the bottom of the trees were avoided to ensure the true representation of the soil from a selected site.

The soil samples were collected by the composting method³. This method offers the advantage of increased accuracy through the use of large numbers of sampling units per sample. In composting, the fundamental assumption is that the analysis of the composted sample yields a valid estimate of the mean, which would be obtained by averaging the results of the analysis from each of the sampling units contributing to the composite. Cline² indicated that this assumption is valid only if (a) The sampling volume represents a homogenous population. (b) Equal amounts of each sampling unit contribute to the sub-samples analyzed. (c) No changes have taken place in the composite and sub-samples prior to analysis that would affect the analytical results. (d) An unbiased estimate of the mean is the only objective. The common procedure in composting is to take a number of individual sampling units (slices or cores)¹. The number of sampling units to make one composite sample ranges from 4–16.

Soil analysis: The soil analysis of the representative soil samples was done by the standard methods¹⁻¹¹

The organic carbon and the organic matter values have been reported in Tables 1 and 2, respectively. In the present study, organic carbon (OC) was found to be in the 0.08–0.72% range, while the organic matter (OM) was found to be in the 0.103–1.275% range in the different selected sites. The observed OM values being low suggest that the fertility of the soils in the almost entire study area is low.

TABLE-1
PERCENTAGE OF ORGANIC CARBON OF THE SOILS

S. No.	Site name	Site No.	Organic carbon (%)											
			Months											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.	Barren land	S1	0.52	0.51	0.54	0.54	0.55	0.52	0.51	0.56	0.52	0.54	0.51	0.50
2.	Village: Garjia	S2	0.40	0.42	0.42	0.44	0.44	0.41	0.45	0.42	0.40	0.38	0.38	0.39
3.	Village: Dhikuli	S3	0.16	0.19	0.19	0.18	0.16	0.17	0.17	0.19	0.17	0.19	0.17	0.17
4.	Forest Land: Ringora	S4	0.70	0.74	0.72	0.71	0.72	0.72	0.72	0.71	0.74	0.72	0.71	0.70
5.	Open Land: Aamdanda	S5	0.40	0.42	0.44	0.43	0.44	0.42	0.42	0.40	0.40	0.44	0.42	0.44
6.	GPG Ground: Ram Nagar	S6	0.51	0.55	0.52	0.54	0.54	0.52	0.52	0.54	0.56	0.52	0.52	0.55
7.	Smriti Van Land: Belgarh	S7	0.08	0.09	0.09	0.09	0.08	0.07	0.07	0.06	0.07	0.09	0.07	0.06
8.	Village: Shivalpur Rionio	S8	0.54	0.57	0.57	0.57	0.58	0.56	0.56	0.54	0.56	0.51	0.56	0.54
9.	Barren Land: Near Block Office	S9	0.52	0.58	0.56	0.56	0.59	0.56	0.56	0.54	0.51	0.54	0.52	0.51
10.	Village: Shankarpur	S10	0.11	0.12	0.11	0.11	0.14	0.13	0.13	0.12	0.11	0.14	0.12	0.12

TABLE-2
% OF ORGANIC MATTER OF THE SOILS OF THE RAM NAGAR REGION OF UTTARANCHAL, INDIA

S. No.	Site Name	Site No.	% of Organic Matter					
			Months					
			Jan	Feb	Mar	Apr	May	Jun
1.	Barren Land	S1	0.896	0.879	0.930	0.930	0.948	0.896
2.	Village: Garjia	S2	0.689	0.724	0.724	0.758	0.758	0.706
3.	Village: Dhikuli	S3	0.275	0.327	0.327	0.310	0.275	0.293
4.	Forest Land: Ringora	S4	1.206	1.275	1.241	1.224	1.241	1.206
5.	Open Land: Aamdanda	S5	0.689	0.724	0.758	0.741	0.758	0.706
6.	GPG Ground: Ram Nagar	S6	0.879	0.948	0.896	0.930	0.930	0.879
7.	Smriti Van Land: Belgarh	S7	0.137	0.155	0.155	0.155	0.137	0.137
8.	Village: Shivalpur Rionio	S8	0.930	0.982	0.982	0.982	0.999	0.965
9.	Barren Land: Near Block Office	S9	0.896	0.999	0.965	0.965	1.017	0.999
10.	Village: Shankarpur	S10	0.189	0.224	0.189	0.189	0.241	0.224

(Contd.)

S. No.	Site name	Site No.	% of Organic Matter					
			Months					
			Jul	Aug	Sep	Oct	Nov	Dec
1.	Barren Land	S1	0.879	0.965	0.896	0.930	0.879	0.862
2.	Village: Garjia	S2	0.775	0.724	0.689	0.655	0.655	0.672
3.	Village: Dhikuli	S3	0.293	0.327	0.293	0.327	0.293	0.293
4.	Forest Land: Ringora	S4	1.241	1.224	1.275	1.241	1.224	1.206
5.	Open Land: Aamdanda	S5	0.724	0.489	0.689	0.158	0.724	0.758
6.	GPG Ground: Ram Nagar	S6	0.896	0.930	0.965	0.896	0.896	0.948
7.	Smriti Van Land: Belgarh	S7	0.120	0.103	0.120	0.155	0.120	0.103
8.	Village: Shivalpur Rionio	S8	0.965	0.930	0.965	0.879	0.965	0.930
9.	Barren Land: Near Block Office	S9	0.965	0.930	0.879	0.930	0.896	0.879
10.	Village: Shankarpur	S10	0.224	0.206	0.189	0.241	0.206	0.206

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