

A NOTE ON THE QUALITY OF WATERS OF TIGER PROJECT AREA, SIMILIPAL (ORISSA)

Similipal National Park, located in Mayurbhanj district, Orissa, is one of the tiger project areas in our country. Geographically it belongs to the region of Northern plateau of Orissa and has a slope from North to South. The forests occupy an area of 2091 square km and harbour four distinct types of vegetation, namely (i) Evergreen (ii) Moist evergreen (iii) Dry deciduous and (iv) Savanna. The area is rich in a variety of herbivorous and carnivorous animals and has been delineated for an experimental programme as a tiger project area, besides being considered as a proposed 'Biosphere Reserve'. For both flora and fauna, the sources of water in the area are either by way of rains or various springs and streams which comprise the perennial drainage system in the area. It is considered, therefore, worthwhile to study the composition/characteristics of the water for which no scientific studies are believed to have been undertaken. The present work has been done with a view to

study the nature of one of the guiding factors, the water, which may possibly be influencing the biota of the region.

With the above objective, four water samples were collected (Nov.-Dec., 1979) from four different places namely the Khairi river near Jenabil, the Devthali river near Devthali, from a nullah at Matughar near Barakamara and from the Deo river during a botanical exploratory tour undertaken in November/December, 1979. Water samples were analysed for calcium, magnesium, sodium and potash for cations, and carbonate, bicarbonate and chloride for anions. Electrical conductivity and pH were also determined. On the basis of these analyses its related properties such as soluble sodium percentage (SSP), residual carbonate in m.e./L. and sodium adsorption ratio (SAR) were also worked out. Hand book No. 60 (1954) of U.S.D.A. was used as a reference for these analyses.

Table 1 : Chemical characteristics of the waters of Similipal

Sample No.	Concentration in m.e./L.								pH	SSP	Residual carbonate in m.e./L.	SAR
	Ca ⁺⁺	Mg ⁺⁺	Na ⁺	K ⁺	CO ₃ ⁻⁻	HCO ₃ ⁻	Cl ⁻	E.C. in micromhos/cm. at 25°C				
1— Khairi river	0.4	0.05	0.078	0.025	—	0.5	0.25	39.7	6.4	15.05	0.05	0.16
2— Devthali river	0.3	0.1	0.080	0.035	—	0.5	0.25	37.7	7.0	16.6	0.1	0.18
3— Nullah at Matughar	0.3	0.1	0.1	0.025	—	0.4	0.20	48.1	7.2	20.0	0	0.22
4— Deo river	0.3	0.1	0.08	0.035	—	0.4	0.20	47.5	7.0	16.6	0	0.18

From the results manifested in table-1 it is clear that the water as a whole irrespective of different places, possesses very meagre amount of dissolved minerals as it is evident from its electrical conductivity values which vary from

37.7 micro mhos/cm in the water sample-2 to 48.1 micro mhos/cm in water sample-3. The reason for such low values of dissolved minerals in the waters may be due to their continuous fast flow on the hard bed (rocks).

Since the water of the springs which is emanating from within the area is not stagnant, therefore, the chances of its mineral dissolving potentialities from terrestrial system is considerably reduced. But whatever amount of minerals is present in the waters, calcium is prominent within cations and bicarbonate is dominant within anions. Carbonate ions are conspicuously absent. From the same table it is also apparent that each cation and anion has insignificant variation within their ionic parameters. The pH values clearly reveal that waters are almost neutral in reaction except water sample-1 which is feebly acidic in nature. The soluble sodium percentage is varying from 15.05 in water sample-1 to 20.0 in water sample-3. The residual carbonate is present only in two water samples 1 and 2, whereas remaining two are free from such content. The waters have also an insignificant variation within the values of sodium adsorption ratio which are ranging from 0.16 in the water sample-1 to 0.22 in the water sample-3.

From the above discussions it is amply

indicated that water regime in the system is deficient with respect to mineral status. But our simultaneous work on soils and forage grasses of the same area clearly suggests that they contain adequate mineral reserves. These mineral rich forage grasses may surely be compensating mineral deficiency caused due to water in herbivorous animals which otherwise may be lacking in the case of carnivorous animals. To compensate such mineral deficiencies specially in carnivorous animals, it is suggested, therefore, that salt licks having sufficient minerals may be placed in the entire reserve for proper management of the wildlife.

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J. N. SINGH AND A. R. K. SASTRY

Botanical Survey of India, Howrah

GNAPHALIUM COARCTATUM WILLD.—A SOUTH AMERICAN TAXON NATURALISED IN CHAMBA DISTRICT (HIMACHAL PRADESH), INDIA

Ever since May 1983, the authors are engaged in the systematic studies on the flora of Chamba district of Himachal Pradesh (Western Himalaya). A species of *Gnaphalium* Linn. (family Asteraceae) was collected on four different occasions which after prolonged investigations and subsequent confirmation at Kew Herbarium was identified as *G. coarctatum* Willd. (Plate I). This is a South American species (Grierson 1980 as

'Spicatum', Hilliard 1983) and has not been reported earlier from India by Hooker (1881) or in the subsequent compilatory lists of new records to Indian flora (Calder *et al.* 1926, Razi 1959, Nayar & Ramamurthy 1973, Nayar and Karthikeyan 1981). According to Santapau & Henry (1973), in India the genus *Gnaphalium* is represented by eight species, the same number as reported by Hooker (1881). Apparently *G. coarctatum*