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## Micro nutrient status of maize growing soils of Tehsil Handwara of Kupwara district in Jammu and Kashmir, India

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**Abstract**

In order to study the micro nutrient status of maize growing soils of Tehsil Handwara, twenty composite soil surface samples (0 - 25 cm) were collected from the area. The soil samples were studied for various physico-chemical properties and available nutrient contents. The soils are neutral in pH, normal electrical conductivity and were non-calcareous. The soils were high in organic carbon content. The micro-nutrient cations viz.; zinc, copper, iron and manganese were in sufficient range in these soils. A significantly negative correlation was obtained between pH and, zinc, copper, manganese, iron, and also between calcium carbonate.

**Keywords:** Nutrient, maize, soils, chemical, available

**Introduction**

Maize (*Zea mays* L.) is one of the important cereal crops next only to wheat and rice in the world. In India, it ranks fourth after rice, wheat and sorghum. In India, maize is cultivated both in kharif and rabi seasons and share of kharif maize is 85 percent of total maize in the country. In spite of the highest share in area, the relative contribution of kharif maize is lower than that of rabi maize due to the vagaries in rainfall pattern. Severity and duration of drought during 2002 in India had caused about 42 percent yield loss in kharif maize (DMR, 2003) [1]. The studies on nutrient status of maize growing soils are essential to generate information regarding efficiency of nutrient availability of soils in order to improve yield and maintain soil health. The information generated would be useful for subsequent research and development activities and shall guide in assessing possible cause of low yield and quality of maize production. Keeping above aspects in mind, the present investigation entitled, "Studies on Nutrient status of Maize Growing Soils of Tehsil Handwara of North Kashmir" was undertaken with the objective to study the micronutrient status of different soils in Handwara tehsil of Kupwara district.

**Materials and methods**

The present investigation, "Studies on Nutrient Status of Maize Growing Soils of Tehsil Handwara of North Kashmir" was carried out. The state of J & K is situated in the north western portion of the India has an area of about 222,870 sq. km. while as the Tehsil Handwara, an efficient cropping zone for maize, is located within a latitude of 34.39. 6'E and longitude 74.29.6'N. Twenty composite surface soil samples at representative sites of Tehsil Handwara were collected. The soil samples collected thereof were investigated for mechanical components, physico-chemical properties and the available nutrient status. Available fraction of micro-nutrient cations viz.; Zn, Cu, Mn and Fe were assessed by extraction with 0.5M DTPA (pH 7.3) (Lindsay and Norvell, 1978) [3] and determined on Atomic Absorption Spectrophotometer.

**Results and Discussion**

The data in the table revealed that the DTPA-extractable zinc ranged from 0.60 to 2.15 mg kg<sup>-1</sup> with mean value of 1.10 mg kg<sup>-1</sup>. The soils in general exhibited sufficient in available zinc. The soils in general exhibited sufficient in available zinc. The amount of extracted zinc is likely to increase with the increase in fineness of the soil texture. It has also been reported that

organic matter plays an important role in controlling availability of zinc particularly in alkaline soils. Similar findings were reported by Vijayasankar Reddy and Seshagiri Rao (1991) <sup>[9]</sup>. The content of available copper ranged from 1.00 to 2.51 mg kg<sup>-1</sup> with a mean value of 1.57 mg kg<sup>-1</sup>. The soils were sufficient in available copper. The soils were in sufficient range, which could be ascribed due to the significantly positive relation between copper and organic carbon besides the continuous and adequate application of farmyard manure, plant residue, as reported by Saha *et al.* (1998) <sup>[6]</sup>, Singh (2006) <sup>[7]</sup>, Singh *et al.* (2012) <sup>[8]</sup>. The data presented and revealed that the DTPA- extractable manganese in the soils ranged from 17.34 to 37.18 mg kg<sup>-1</sup> with mean value of 24.89 mg kg<sup>-1</sup>. The soils were sufficient in available manganese. The sufficient content of manganese in soils, which could be attributed to higher content of organic carbon further supported by significantly positive correlation between organic carbon and available manganese. The results were in accordance with Rao (1992) <sup>[5]</sup>, Mohan Murli (2004) <sup>[4]</sup>, Singh *et al.* (2012) <sup>[8]</sup>. The perusal of data revealed that the DTPA- extractable iron varied from 21.10 to 47.20 mg kg<sup>-1</sup> with mean value of 30.83 mg kg<sup>-1</sup>. The soils were sufficient in available iron. The available iron was found to increase with increase in CEC of soils due to more availability of exchange sites on soil colloids as is evidenced by the significantly positive correlation of iron with organic matter. The organic matter form soluble complexes with iron which becomes available to plants. Gupta (2003) <sup>[2]</sup> and Yadav and Meena (2009) <sup>[10]</sup>. Similar findings were reported by Vijayasankar Reddy and Seshagiri Rao (1991) <sup>[9]</sup>.

**Table 1:** Micro-nutrient status of maize growing soils of Tehsil Handwara of North Kashmir.

Serial No.	Zinc	Copper	Manganese	Iron
	(mg kg <sup>-1</sup> )			
L <sub>1</sub>	0.71	1.23	22.13	26.80
L <sub>2</sub>	0.73	1.31	22.15	27.27
L <sub>3</sub>	1.80	1.86	32.11	38.35
L <sub>4</sub>	0.69	1.20	18.88	25.30
L <sub>5</sub>	2.15	2.51	37.18	47.20
L <sub>6</sub>	1.83	2.16	32.52	39.04
L <sub>7</sub>	0.95	1.64	24.26	28.36
L <sub>8</sub>	2.10	2.51	36.11	45.21
L <sub>9</sub>	1.66	1.80	30.49	36.94
L <sub>10</sub>	0.73	1.52	22.18	27.36
L <sub>11</sub>	0.65	1.17	17.65	23.64
L <sub>12</sub>	0.98	1.64	25.08	30.71
L <sub>13</sub>	0.70	1.22	22.11	25.97
L <sub>14</sub>	1.89	2.33	35.54	43.88
L <sub>15</sub>	0.63	1.03	17.62	23.60
L <sub>16</sub>	0.66	1.19	18.55	23.81
L <sub>17</sub>	0.62	1.02	17.38	21.40
L <sub>18</sub>	0.68	1.19	18.62	23.91
L <sub>19</sub>	1.12	1.78	29.88	36.68
L <sub>20</sub>	0.60	1.00	17.34	21.10
Mean	1.10	1.57	24.89	30.83
Range	0.60-2.15	1.00-2.51	17.34-37.18	21.10-47.20

## Conclusion

The micro-nutrient status of these soils revealed that available zinc, copper, manganese and iron ranged from 0.60 to 2.15, 1.00 to 2.51, 17.34 to 37.18 and 21.10 to 47.20 mg kg<sup>-1</sup>, respectively. The soils in general showed sufficient micro-nutrient status.

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