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Nutritional Survey of Ber orchards in Nagaur, Jalore and Sirohi district of Rajasthan

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Abstract

The ber orchards located at Nagaur, Sirohi and Jalore districts of Rajasthan were surveyed in 2013 to 2014. The soil and leaf samples were collected from Nagaur, Sirohi and Jalore district of Rajasthan. These samples were dried, grinded and analyzed for nutrient analysis. Results showed that the nitrogen, phosphorous, calcium, magnesium, content in soil and leaf samples were recorded higher in Sirohi district followed by Nagaur and Jalore whereas the potassium content was recorded more in Nagaur ranked by Jalore and Sirohi. The ber yield was also recorded more in Sirohi district as compared to Jalore and Nagaur, the possible reason of more yield in Sirohi district might be due to higher content of nitrogen, phosphorus, calcium and magnesium in soil as well as in leaf samples.

Keywords: Ber, yield, nitrogen, phosphorus, potassium, calcium, magnesium

Introduction

Indian Jujube or ber is a common fruit endogenous to India. Its fruits are palatable and delicious with high concentration of vitamin A, B and B complexes. Ber leaves contain 10-19 % crude protein with about 40% digestibility. The leaves are commonly used as a fodder for animals (Pareek, 1983) ^[6], compared to other agricultural and horticultural crops, Indian Jujube is known to grow successfully under a low erratic rainfall. Temperature extremes and saline soils with low fertility (Meena *et al.*, 2003) ^[5]. The results were validated by estimating various nutritional parameters; macro nutrient analysis in soil and leaf samples collected from Sirohi, Nagaur and Jalore districts of Rajasthan.

Materials and Methods

The ber orchards located at Nagaur, Sirohi and Jalore districts of Rajasthan were surveyed in 2013 to 2014. The soil and leaf samples were collected from these orchards. The samples were collected from three places randomly in a ber orchard of each district. These samples were dried, grinded and analyzed for nutrient analysis by using standard analysis methods. The samples of soil and leaf were collected at the time of pre-anthesis stage. The mature leaves were taken for nutritional analysis work. The soil samples were collected from up to depth of 60 cm and mixed properly.

Plant and soil analysis

After collecting the soil samples were dried and grinded, sieved by 1mm pore size sieve and mixed homogenously. After plant sample collection, the fresh tissue decontaminated from dust and other foreign materials by adopting the following procedure. Three plastic container are taken in which 0.2% liquid detergent, N/10 Hcl solution and deionized or distilled water solutions are added separately. The fresh tissues should be washed sequence in these three plastic containers. The samples are dried in an oven at 70°C. The nitrogen content in soil and in leaf samples were estimated by using Kjehl-Tek Nitrogen Analyzer. The phosphorus was determined colorimetrically in soil and leaf samples following the methods of Olsen *et al.*, 1954 ^[4] and Jackson, 1973 ^[2]. The potassium content were estimated by the method of Metson.1956 ^[3] in soil samples whereas in plant samples by the method of Bhargava and Raghupati, 1993 ^[1] using flame photometer. Likewise, the concentration of Calcium and magnesium in soil and leaf samples were determined according to Richards, 1954.

Results and Discussion

The data (table 1) showed that the maximum nitrogen and phosphorus content were recorded

Table 1: Soil sample analysis data of Ber orchards located at Nagaur, Sirohi and Jalore district of Rajasthan.

Parameters	Years of survey	District Surveyed								
		NAGAU			SIROHI			JALORE		
		Location I	Location II	Location III	Location I	Location II	Location III	Location I	Location II	Location III
N (Kg/ha)	2013	195	221	195	271	271	246	120	145	145
	2014	275	301	275	351	351	326	200	225	225
	Mean	235	261	235	311	311	286	160	185	185
P ₂ O ₅ (Kg/ha)	2013	9.85	11.28	11.69	12.31	13.14	13.75	9.44	10.46	10.26
	2014	10.3	10.7	12	12.3	13	13.2	9.9	9.9	9.9
	Mean	10.08	10.99	11.84	12.31	13.07	13.47	9.67	10.18	10.08
K ₂ O (Kg/ha)	2013	280	112	224	112	78.4	84	123.2	112	198.4
	2014	188	201	174	134	120	120	161	147	134
	Mean	234	156.5	199	123	99.2	102	142.1	129.5	166.2
Ca (mg/Kg)	2013	88.2	151.6	109.8	273.2	266.6	259.8	98.2	81.6	100
	2014	93.2	163.2	123.2	290	256	276	103	97	156
	Mean	90.7	157.4	116.5	281.6	261.3	267.9	100.6	89.3	128
Mg (mg/kg)	2013	108.7	141.2	101.7	296.9	272.4	215.5	80.3	76.2	127.9
	2014	124	138	134	309	234	198	106	78	141
	Mean	116.35	139.6	117.8	302.9	253.2	206.7	93.15	77.1	134.45
Yield (Kg/tree)	2013	25	22	25	80	50	70	25	25	30
	2014	30	30	25	50	35	55	40	30	35
	Mean	27.5	26	25	65	42.5	62.5	32.5	27.5	32.5

in soil samples of Sirohi district (19.49, 41.63% and 15.28, 23.0% more than Nagaur and Jalore).The calcium and magnesium content were also seen more in the soil samples of Sirohi district (55.0, 60.6% and 51.0, 60.0% more than Nagaur and Sirohi district).Whereas the potassium content was recorded more in soil samples of Nagaur district (25.73 and 45.0% more than Jalore and Sirohi).
The maximum nitrogen and phosphorus content were also

recorded in leaf samples of Sirohi district (26.58, 27.84% and 23.1, 23.1% more than Nagaur and Jalore).The calcium and magnesium content were also seen more in the leaf samples of Sirohi district (6.69, 26.55% and 6.89, 15.17% more than Nagaur and Sirohi district).Whereas the potassium content was recorded more in leaf samples of Nagaur district (2.71 and 24.43% more than Jalore and Sirohi).

Table 2: Leaf sample analysis data of Ber orchards located at Nagaur, Sirohi and Jalore district of Rajasthan.

Parameters	Year	District surveyed								
		Nagaur			Sirohi			Jalore		
		Location I	Location II	Location III	Location I	Location II	Location III	Location I	Location II	Location III
N (%)	2013	1.82	2.27	2.11	2.21	2.48	2.25	1.72	1.76	1.64
	2014	1.86	2.25	2.13	2.25	2.55	2.48	1.68	1.8	1.68
	Mean	1.84	2.26	2.12	2.23	2.515	2.365	1.7	1.78	1.66
P ₂ O ₅ (%)	2013	0.15	0.23	0.16	0.23	0.2	0.31	0.16	0.24	0.16
	2014	0.17	0.21	0.18	0.21	0.23	0.25	0.18	0.2	0.16
	Mean	0.16	0.22	0.17	0.22	0.215	0.28	0.17	0.22	0.16
K ₂ O (%)	2013	2.16	2.23	2.28	1.77	1.62	1.68	2.17	2.16	2.18
	2014	2.1	2.28	2.25	1.74	1.56	1.65	2.1	2.19	2.1
	Mean	2.13	2.255	2.265	1.75	1.59	1.665	2.14	2.18	2.14
Ca (%)	2013	0.31	0.34	0.41	0.38	0.42	0.34	0.32	0.31	0.24
	2014	0.35	0.39	0.46	0.42	0.49	0.37	0.28	0.35	0.28
	Mean	0.33	0.365	0.435	0.4	0.455	0.355	0.3	0.33	0.26
Mg (%)	2013	0.12	0.14	0.16	0.14	0.15	0.14	0.13	0.12	0.13
	2014	0.12	0.13	0.14	0.16	0.13	0.14	0.11	0.14	0.11
	Mean	0.12	0.135	0.15	0.15	0.145	0.14	0.12	0.13	0.12

The ber yield was recorded higher in Sirohi district of Rajasthan (45.5 and 53.8% more than Jalore and Nagaur). The possible reason of more ber yield in Sirohi may be due to higher content of nitrogen, phosphorus, calcium and magnesium in soil as well as in leaf samples.

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