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ORIGINAL ARTICLE

Effect of Organic Matter and Iron Levels on Yield and Nutrient Uptake by Oat (*Avena Sativa* L)

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ABSTRACT

A green house experiment was conducted to find out the effect of organic matter and iron on yield and nutrient uptake by oat. The present study comprises two levels of organic matter and four levels of iron. The green foliage and dry matter yield increased significantly with increasing levels of organic matter and iron. The interaction of iron and organic matter was found to be significantly batter. The maximum green foliage and dry matter yields and N, P and iron content and uptake were recorded at 2 % organic matter and 20 ppm iron level. Iron and organic matter integrated synergistically in increasing the yield.

Key words: *Organic Matter, Iron Levels, Yield and Nutrient*

INTRODUCTION

Oat is grown in winter season for use as fodder crop. It provides very new nutritional fodder especially suited for horses and milch animals the judicious fertilization is one of the important factors for maximum production with high analysis fertilizers proper use of all essential nutrients through integrated use of fertilizers ,manures ,soil amendments crop residues and other product essentials to maintain the soil fertility. Out of all essential micro nutrients iron is especially important owing to its vital and indispensable plant growth. It plays important a role in enzyme system, chlorophyll, chloroplast and pristine synthesis and electron transport during respiration.

Organic matter is essential to maintain the soil fertility and we can say that it is the store house of plant nutrient. Organic matter application increases the plant available phosphorus, potassium and magnesium of soils and organic matter are the rich source of primary nutrient of plant nutrient of Nitrogen, Phosphorus and potassium. Oat crop can be grown under wide range of conditions and respond well especially to good soil fertility hence, the present experiment was undertaking to study the effect of organic matter and iron levels on yield and nutrient uptake by oat. Under taking Agro climatic conditions of R B S College and to find out the most suitable doses of Iron with organic matter recommended for profitable winter oat crop fodder production.

MATERIALS AND METHODS

A green house experiment was conducted during 2009-10 in the Deptt of Agricultural Chemistry and Soil Science R.B.S. College Bichpuri, Agra (UP). The experiment was laid out in randomized block design with three replication having eight treatment combination on sandy loam soil pH 8.2,Ece 1.0 ds/m, organic carbon .06%, available N, P, K and Fe in the soil were 128,12.4,115Kg/ha and 5.26 ppm,respectively. Earthen pots of 30 cm diameter size were filled with 10 Kg soil .The different level of organic matter, Iron and recommended doses of N_2 , P_2O_5 and k_2O (80,40,40Kg/ha) were applied then oat seeds were shown at proper moisture level and the observations were recorded as fresh and dry matter weight. The standard methods were adopted for chemical analysis. The oat crop was grown under recommended package of practices.

RESULTS AND DISCUSSION

Yield Study: A study of table 1 reveilles' that green foliage and dry matter yield of oat increased significantly with the application of organic matter at 2% organic matter. Singh *et. al,* 2000.

This increasement in green foliage and dry matter yield were 22.9 and 22.7% respectively over control. This increasement on yield of due to organic matter addition is obvious as it is considered as a store house of plant nutrient apart from improving the physiochemical properties and biological properties of soil. The application of iron increased the green foliage and dry matter yield significantly as compared to control at all three increasing levels. The maximum green foliage and dry matter yield were recorded at 20 ppm iron level. The increasement in yield with increasing levels of iron is due to increasing availability of iron application and moreover addition of organic matter also resulted lowering of soil pH thus increasing the solubility of native and applied iron. The results are in conformity with the finding of Singh and Singh (2003).

Table 1: Effect of organic matter and iron levels on green foliage and dry matter yields of oat

TREATMENT Levels of organic matter (%)	Green foliage yield (gram per pot)	Dry matter yield (gram per pot)
0	21.86	4.37
2	26.86	5.36
SEM-	0.47	0.76
CD at 5%	0.96	0.137
Levels of iron(ppm)		
0	21.81	4.36
5	23.73	4.74
10	25.38	5.01
20	26.50	5.33
SEM-	0.333	0.047
CD at 5%	0.678	0.097

INTERACTIONS

The interaction effect of iron and organic matter on green foliage and dry matter yields of oat were found to be significant. The data pertaining to this interaction are presented in table 2. The iron application increases the yield significantly in presence or absence of organic matter. The maximum yields were recorded under 20 ppm Fe and 2% organic matter. The iron and organic matter interacted synergistically increasing the yields. Singh and Singh (2003) also recorded the similar results.

Table 2: Interaction of Fe and organic matter on green foliage and dry matter yield of oat

Iron Level (ppm)	ORGANIC MATTER LEVELS			
	0%		%	
	Green foliage yield (g/pot)	Dry matter yield (g/pot)	Green foliage yield (g/pot)	Dry matter yield (g/pot)
0	19.66	3.92	23.77	4.80
5	21.03	4.18	26.43	5.30
10	23.12	4.61	27.65	5.43
20	23.55	4.73	29.35	5.93
SEM-	-	-	0.266	0.095
CD at 5%	-	-	1.36	0.193

CHEMICAL COMPOSITION OF OAT

Table 3 shows that application of organic matter increased the nitrogen content and uptake significantly over control but iron did not affect the nitrogen and phosphorous content beside its uptake. The iron application proved beneficial as much as it enhanced the utilization of N and P by oat plant significantly. The maximum N and P uptake value were recorded at 20 ppm iron level. The iron content and uptake increased significantly with increasing levels of organic matter and iron levels. The maximum iron content and uptake were recorded at 20 ppm iron. It is also recorded that maximum N and iron content and its uptake value were found at 2% organic matter and 20 ppm iron level due to synergistic effect of N and iron content and its uptake. Our findings are agreed with Singh and Singh (2003).

Table 3: Effect of organic matter and iron on N, P and iron content & uptake by oat

Treatment	Nitrogen		Phosphorous		Iron	
	Green Foliage		Green Foliage		Green Foliage	
Levels of organic matter (%)	Content (%)	Uptake (mg/pot)	Content (%)	Uptake (mg/pot)	Content (%)	Uptake (mg/pot)
0	1.35	58.66	0.188	8.26	-73.15	0.31
2	1.76	94.33	0.199	10.71	-74.80	0.40
SEM-	0.083	4.96	0.0067	0.42	1.216	0.017
CD at 5%	0.169	10.12	0.0136	0.85	2.478	0.034
Levels of iron (ppm)	Dry matter		Dry matter		Dry matter	
0	1.53	68.10	0.198	8.60	67.95	0.29
5	1.52	73.30	0.197	9.35	71.33	0.33
10	1.53	33.98	0.192	9.65	75.93	0.37
20	1.47	80.68	0.193	10.32	80.70	0.47
SEM-	0.136	3.51	0.0047	0.265	0.739	0.012
CD at 5%	NS	7.16	NS	0.601	1.507	0.024

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