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EFFECT OF INTEGRATED NUTRIENT MANAGEMENT ON HERBAGE, DRY FODDER YIELD AND QUALITY OF OAT (*AVENA SATIVA* L.)

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SUMMARY

A field experiment was conducted during **rabi** 2005-06 at Adaptive Trial Centre, Tabiji, Ajmer (Rajasthan), to study the effect of nutrient management on green forage yield, dry matter and crude protein yield of oats. fodder, dry matter and crude protein yield of oat was significant. Application of 100 % RDF along with 5 t/ha vermi-compost (T_3), being at par with 100% RDF alone (T_1) and 100% or 75 % RDF with organics (T_2, T_4 & T_5,) produced significantly higher green fodder over organics only (T_6 & T_7).

Key words : INM, herbage, dry fodder, qulaity, oat

Oat is an important winter season crop widely grown for green fodder because of its luxuriant growth; good palatability and highly nutritious nature. The nutrient requirement of oat is comparatively higher over other *rabi* fodder crops. To meet out this demand higher doses of inorganic fertilizers are required which is uneconomical for fodder production and indiscriminate and continuous use of high amount of chemical fertilizers had deleterious effect leading to decline in productivity due to limitation of one or more micronutrients (Nambiar & Abrol,1989). It also adversely affected soil health leading to various other problems. Hence it compelled scientific society to look in to the philosophy of integrated use of nutrient sources. Integrated nutrient management holds great promise not only for securing high productivity but also against deterioration of soil environment (Paikaray *et. al.*2002). However, no systematic studies have been carried out so far on combined use of chemical fertilizers, organic manures and bio-fertilizers in this crop under semi arid conditions of Rajasthan. Hence, keeping these facts in view the present investigation was carried out with an object to find out appropriate combination of organic and inorganic nutrient.

A field experiment was conducted during **rabi** 2005-06 at Adaptive Trial Centre, Tabiji, Ajmer (Rajasthan), to study the effect of nutrient management on green forage yield, dry matter and crude protein yield of oats. The seven treatments comprising of 100 per cent RDF ($N_{80}P_{40}$) (T_1), T_1+10 t FYM (T_2), T_1+5 t vermi-compost (T_3), 75 per cent RDF+10 t FYM + seed inoculation with *Azotobacter* (T_4), 75 per cent RDF+ 5 t vermi-compost + seed inoculation with *Azotobacter* (T_5), 10 t vermi-compost (T_6) and 20 t FYM (T_7) were taken in randomized block design with three replications. The soil of the experiment field was sandy loam in texture, slightly alkaline in reaction (pH of 8.1) with 0.21 per cent organic carbon and 155, 14.7 and 186.5 kg/ha of available nitrogen, phosphorus and potash. Oat variety 'Kent' was sown in rows by drilling 23 cm apart on 11th November. Weeding and other agronomic practices were done as per recommendations. For green forage yield the crop was harvested twice first at flower initiation and second 45 days after first cutting. A green fresh sample of 1.0 kg from each harvested plot was dried in oven at 70° C for 48 hrs to determine dry matter content and dry matter yield. Dried samples of plants were ground and the nitrogen content was estimated using standard analytical methods (A.O.A.C., 1965). Crude protein content was calculated by multiplying nitrogen content with factor 6.25. At the time of each harvesting, observations on plant height, number of shoots per meter row length were recorded.

Growth of oat in terms of plant height and number of shoots per meter row length varied significantly due to various fertility levels (Table-1). Application of 100 % RDF with 5 t /ha vermi-compost gave the tallest plants and maximum number of shoots

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TABLE 1
Effect of integrated nutrient management on growth, yield and quality of oats

Treatments	Plant height			Number of shoots/			Green forage yield			Dry matter yield			Crude protein		
	Ist cutting	IInd cutting	Mean	Ist cutting	IInd cutting	Mean	Ist cutting	IInd cutting	Mean	Ist cutting	IInd cutting	Mean	Ist cutting	IInd cutting	Mean
T_1 : 100% RDF (N_{80} : P_{40})	118.4	89.5	104.0	85.0	56.0	70.5	191.0	103.0	294.0	34.3	23.7	58.0	1.29	0.83	2.12
T_2 : T_1+10t FYM	122.1	92.3	107.2	88.0	59.7	73.8	199.2	107.2	306.4	36.5	24.3	60.8	1.43	0.91	2.34
T_3 : T_1+5t vermicompost	128.2	95.1	111.8	92.7	61.7	77.8	210.4	118.6	329.0	40.6	27.4	68.0	1.64	1.00	2.64
T_4 :75 % RDF+10 t FYM seed inoculation with *azotobacter*	120.9	90.7	105.7	86.0	57.0	71.5	191.6	109.9	300.2	35.9	26.2	62.1	1.49	0.98	2.47
T_5 : 75% RDF+5 t vermicompost+Seed inoculation with *azotobacter*	121.1	91.0	106.0	87.3	58.3	72.8	192.0	110.2	302.2	36.2	26.5	62.7	1.44	0.95	2.39
T_6 : 10 t vermicompost	116.5	82.4	99.5	73.3	42.0	57.7	183.5	83.8	267.3	34.5	20.4	54.9	1.33	0.72	1.95
T_7 : 20 t FYM	114.1	78.2	96.2	69.0	38.3	53.7	176.5	78.7	255.0	33.6	19.5	53.1	1.26	0.69	1.95
C. D. (P=0.05)	7.61	5.43	4.36	8.54	6.29	5.17	18.03	13.28	38.04	3.96	3.20	5.11	0.18	0.12	0.21

and found superior over remaining fertility levels except T_2 for both parameters and T_5 for shoot number only. This might be due to adequate and continuous supply of nutrients at different stages due to release of sufficient amount of nutrients by easy mineralization in vermi-compost in comparison to FYM at a constant level that resulted in higher plant growth. Pathak *et al.* (2002) found similar findings in maize crop. Application of neither organics (10 t /ha of vermi-compost and 20 t of FYM) nor in-organics (100% RDF) alone brought significant improvement in plant height and shoot number per meter row length, therefore failed to reach at par with their combined use which clearly indicates the significance of integration of organic and inorganic sources of nutrients for better growth. Improvement in growth parameters owing to the application of organics with chemical fertilizers could be attributed to well developed root system which ultimately resulted in a healthy plant system (Havlin *et al.*1999).

The effect of different fertility levels on the green fodder, dry matter and crude protein yield of oat was significant (Table-1). Application of 100 % RDF along with 5 t/ha vermi-compost (T_3), being at par with 100% RDF alone (T_1) and 100% or 75 % RDF with organics (T_2, T_4 & T_5,) produced significantly higher green fodder over organics only (T_6 & T_7). This might be due to higher values of growth parameters with this treatment. Green fodder yields obtained at 75 % RDF +5 t of vermi-compost or 10 t of FYM with *Azotobacter* (T_4 & T_5) were at par with 100 % RDF (T_1), 100 % RDF +10 t FYM (T_2) and 100 % RDF +5 t vermi-compost (T_3) which clearly demonstrates the saving of fertilizers N and P to the order of 20 and 10 kg/ha with the use of bio-inoculant either with 5 t of vermicompost or 10 t of FYM. The results confirm the findings of Sharma *et al*. (2003) and Sharma and Sharma (2004) that organic manures help in economizing the use of chemical fertilizers. Significantly maximum dry matter was found when 100% RDF was applied with 5 t vermi-compost/ ha (T_3), which might be because of maximum plant height, number of shoots per metre row length and green fodder yield with this treatment. The crude protein yield also varied significantly with different doses and sources of nutrients. Highest crude protein yield was recorded with application of T_3 (100 % RDF+5 t of vermi-compost) followed by T_4 (75% RDF+5 t vermi-compost). The increased crude protein yield was due to added supply of nutrients and well developed root system under balanced nutrient application resulting in better absorption of water and nitrogen.

Thus, it may be inferred that higher green herbage, dry matter yield and quality of oat can be obtained with integration of either vermi-compost @ 5 t /ha or FYM 10 t/ ha and *Azotobacter* with 75 per cent RDF resulted in saving of 25 per cent chemical fertilizer.

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