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GREEN WEEDS AS A SOURCE OF MANURE USED FOR PRODUCTION OF MAIZE VEGETATION

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ABSTRACT
Weeds are plants, which grow in places where they are not required. Weeds add to the cost of cultivation, impair the quality as well as reduce the market value of the farm produce, harbour insects, fungal and virus pests that attack on crop plants. Weeds form a free crop of great potential value; an economic utilization of these resources through compost manure production can help not only in meeting the challenge of energy crisis but also keeping environment pollution free. The weed vegetation of *Cassia tora* L., *Achyranthes aspera* L., *Tephrosia hamiltoni* Drumm., *Crotolaria notonii* Wt. and Arn. were used for the preparation of green manure. The promising effects of green manure on maize yield have been discussed in present paper.

KEY WORDS: compost, growth, manure, weeds

INTRODUCTION

Green manure can be defined as a practice of ploughing or turning into the soil undecomposed green plant tissues for the purpose of improving physical structure as well as fertility of the soil. From time immemorial the turning in a green crop to better the condition of the soil has been a common agricultural practice (Yewalkar *et. al.*, 1977) An ideal green manure crop should possess the following traits (FAO, 1977: IRRI, 1988: COSICO, 1990) show early establishment and high seeding vigour, it possess early onset of N fixation and its efficient sustenance, it is easy to incorporate, It is quickly decomposable, Its is tolerant to pests and diseases.

MATERIALS AND METHODS

The experiment was conducted in the Botanical garden of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. (M.S.) The treatments were replicated 4 times for 4 weeds and compared with NPK fertilizers along with control. The weeds were collected (uprooted) from roadsides and field in the university campus. They were cut into small pieces as 4 to 6" (10 to 15 cms) by the traditional iron cutter (wili) and buried in soil at 10 % flowering stage at 15 to 20 cm deep in the soil at the rate of 13503 kg/ha. Well fermented farmyard manure was also buried at the rate of 77160 kg/ha. along with the weeds in weed treatment plots and at the rate of 13503 kg/ha. in control and fertilizer treatment plots. The field was irrigated and weeds were allowed to decompose for 61 days. The maize variety 'African Tall' produced by National Seed Corporation Ltd., Beej Bhavan, Pusa Complex, New Delhi, was cultivated in 3.6 x 3.6 m plots keeping 22.5cm distance in rows. The seed rate was 75 kg/ha. the sowing was done in October.

Minimum use of fertilizer was made, fertilizer were applied as NPK through urea, single super phosphate and muriate of potash and mixed fertilizer at the rate of 120 kg N, 80 kg P and 40 Kg K for the treatment plots and fertilizer treatment plot was given 240 kg N/ha in two split doses and the first dose of single super phosphate was applied just before sowing. After 110 days crop was harvested early in the morning and the fresh yield of the aerial part of the crop was noted and calculated as kg/ha. Three kg sample of fresh vegetation was pulped (Davys and Pirie 1969) from it 100 gm of pulp was dried in ovan at 90^0C till it gives constant wt for the determination of Dry matter (D.M.). Dried sample was griended to fine powder and used for further analysis. Nitrogen (N) was measured by Micro Kjeldhal's method and Crude protein (C.P) was expressed as N X 6.25.

The method described by Fiske and Subba Row (1925.) as outlined by Oser (1979) was followed for Phosphorus estimation. Potassium estimation was done by flame photometer. The concentration was calculated on the basis of standard graph prepared by using variable concentration of the standard solution. Total reducing sugar was estimated by Foling Wu Tube method. The results were statistically analyzed by the standard method of Analysis of variance and found to be significant over the control.

RESULTS AND DISCUSSION

The average fresh yield of fresh vegetation was 21720 kg/ha for control, 53395 for urea, 62943 kg for *Crotolaria*, 61998 for Cassia, 59915 for *Tephrosia* and 59316 for *Achyranthes* treatments. The forage yield of maize kg/ha/day was 197 kg for control, 485 kg for urea, 572 kg for *Crotolaria*, 564 kg for *Cassia*, 545 kg for *Tephrosia* and 539 kg for *Achyranthes* treatment. All the results are reported in the Table 1 and 2.The results compaired with the data of Vats and Sidhu, (1978); Vinod Sharma and Angrias (1996); Tyagi and Tyagi (1989) and Jerome Goldstein (1996).

Though the fertilizer treatment given double amount of N Kg/ha still it could not compete with the weed green manure treatments. Control plots given the lowest yield followed by urea treatment. The forage yield kg/ha/day was found highest in *Crotolaria* treatment followed by *Cassia* and then in *Tephrosia* treatment. The percent increase over control vegetation was 146 kg/ha in urea, 190 in *Crotolaria*, 185 in *Cassia*, 176 in *Tephrosia* and 173 in Achyranthes. The fertilizer treatment given the lowest yield, *Crotolaria* shown the highest percent increase over control for fresh wt. followed by *Cassia* and *Tephrosia.* The dry matter kg/ha was 2335 kg/ha in control, 8143 in urea, 9599 in *Crotolaria*, 8754 in *Cassia*, 8465 in *Tephrosia* and 8381 in *Achyranthes* treated plots.

The dry matter kg/ha/day was 21 in control, 74 in urea, 87 in *Crotolaria*, 78 in *Cassia*, 77 in *Tephrosia* and 76 in *Achyranthes.* The percent increase of dry matter over control was 313 kg/ha in *Crotolaria*, 276 in *Cassia*, 261 in *Tephrosia*, 261 *in Achyranthes* and only 248 in urea. The percent increase of dry matter was highest in *Crotolaria* followed by *Cassia* and then in *Tephrosia* as in the fresh weight.

Table 1. Effect of weeds as green manure on maize yield (Age of Plant: 110 days.)

Sr. No	Treatments	Fresh weight (kg/ha)	Dry matter kg/ha	Nitrogen Kg/ha	Crude protein Kg/ha	Potassium %	Phosphorus %	Calcium %	Total reducing sugar (Kg/ha)
1	Control	21720	2335	26	162	0.93	0.086	0.15	70
2	Urea	53395	8143	190	1787	1.00	0.106	0.17	274
3	Crotolaria	62943	9599	251	1569	0.93	0.114	0.20	530
4	Cassia	61998	8754	211	1319	1.30	0.108	0.20	495
5	Tephrosia	59915	8465	194	1212	1.20	0.120	0.18	405
6	Achyranthes	59316	8381	199	1244	1.30	0.130	0.20	506
	S.E.	6296	1227	36	128	-	-	-	51.01
	C.D	15405	3003	88	312	-	-	-	124.82

Table- 2. Nitrogen efficiency ratio and percent increase over control of maize crop yield cultivated on green manure

Sr No.	Treatments	Input N Kg/ha	Increa-se Veg .Kg/ha over control	Increase D.M. Kg/ha over control	Increase of total N over control	Nitrogen efficiency ratio of fresh wt.	Nitrogen efficiency ratio of D.M.	Percent increase over control			
								Fresh wt. (Kg/ha)	Dry matter (kg/ha)	Nitrogen (Kg/ha)	Total reducing sugar (Kg/ha)
1	Control	-	-	-	-	-	-	-	-	-	-
2	Urea	240	31675	5785	164	132	24	146	248	631	289
3	Crotolaria	396	41223	7311	225	104	18	190	313	865	654
4	Cassia	373	40278	6439	185	108	17	185	276	711	604
5	Tephrosia	405	38195	6093	168	94	15	176	261	646	476
6	Achyranthes	374	37596	6100	173	100	16	173	261	665	620

The crude protein kg/ha was 162 in control, 1787 in urea, 1569 in *Crotolaria*, 1319 in *Cassia*, 1212 in *Tephrosia*, 1244 kg in *Achyranthes.* The nitrogen kg/ha was 26 in control, 190 in urea, 251 in *Crotolaria*, 211 in *Cassia*, 194 in *Tephrosia* and 199 in Achyranthes. The percent increase of nitrogen kg/ha was highest in *Crotolaria* 865, followed by *Cassia* 711 and then 665 in *Achyranthes.* The nitrogen increase kg/ha, crude protein kg/ha and percent increase of nitrogen over control followed the same sequence as *Crotolaria, Cassia, Achyranthes* treatments.

The nitrogen efficiency ratio for fresh wt. was 132 in urea, 104 in *Crotolaria*, 108 in *Cassia*, 94 in *Tephrosia* and 100 in *Achyranthes* manure. The input in each manure treatment was at the rate 320 kg N/ha through compost, 120 kg N through urea and remaining was the nitrogen from green vegetation. Though *Crotolaria* and *Tephrosia* given the better yields of fresh vegetation and dry matter but for nitrogen efficiency it could not compete with *Cassia* for Vegetation but in dry matter *Crotolaria* treatment gave better results.

The nitrogen efficiency ratio for dry matter was 24 in urea, 18 in *Crotolaria*, 17 in *Cassia*, 15 in *Tephrosia* and 16 in *Achyranthes.* Though urea treatment given better results of nitrogen efficiency and more increase as 23 kg more for fresh wt. and 6 kg more for dry matter to get that much higher yield. We have to spend at least Rs. 2500 to 3000 per ha. as per the today's market rate of nitrogen fertilizer.

When the nitrogen efficiency was calculated only on the green manure basis, because the urea nitrogen and nitrogen from compost was common for all the manure treatments, then *Cassia* given better results followed by *Achyranthes* and then *Crotolaria* treatment for fresh vegetation and dry matter. When we come to the cost benefit ratio the costly nitrogen fertilizers having the lowest nitrogen efficiency ratio cannot compete with weed green manures.

Today there is an urgent need to educate farmers about this open treasure of nature which we are wasting carelessly at the high rate. The total reducing sugar kg/ha was highest in *Crotolaria* as 530, followed by *Achyranthes* 506 and then in *Cassia* 495 kg/ha. The total reducing sugar content was lowest in control followed by urea treatment. Thus giving caution for using heavy doses of nitrogen for the crop plants and reducing the total sugar content of the crops. The percent increase of sugar content kg/ha was highest in *Crotolaria*, followed by *Achyranthes* and then in *Cassia*. Though the sugar percent was highest in *Achyranthes* followed by *Cassia* and *Crotolaria.* As compared to the other manuring methods weed green manuring is the best, active and cheapest source of plant nutrients as it is less wasteful and time consuming.

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