June 2009 *Volume 3 Issue 1*

Trade Science Inc.

Research & Reviews in

BioSciences

Regular Paper

RRBS, 3(1), 2009 [21-23]

Influence of green manure (chick pea) on the yield and quality of Radish (*Raphanus sativus* var.pusa chetki)

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Received: 5th May, 2009 ; Accepted: 10th May, 2009

ABSTRACT

A pot culture experiment was conducted to assess the effect of fresh, composed and vermicomposted *parthenium* and poultry droppings on the yield and quality of radish. There were fifteen treatments each with three replications. The yield parameters were assessed on 45 and 60 DAS (Days after sowing). Longest bettles were in T_6 on 45 DAS and T_4 on 60 DAS .T_5 on 45 DAS and T_3 on 60DAS had increased bettle diameter. Maximum bettle weight was in T_2 on 45 DAS. After incorporating chickpea,T_{13} showed higher protein content and T_5 exhibited higher ascorbic acid content.

KEYWORDS

Radish;
Compost and vermicompost;
Parthenium;
Poultry droppings;
Yield;
Quality attributes.

INTRODUCTION

With the advent of high yielding cultivars, cost of fertilizers had increased because of low indigenous production and lack of foreign exchange, concern for pollution and conservation of energy. Farmers tend to use more of organic materials of plants and animal origin as substitutes. Selection of organic materials as a source of fertilizers is mainly influenced by nutrient content in it and rate at which it undergoes mineralization in liberating the nutrients[1].

Leguminous green manures have traditionally been used as a source of plant available nitrogen and as a means of improving soil productivity. In green manure production system, incorporation of fresh green manures at proper depth is essential to increase its efficiency.

Hence the present study was carried out to study the effect of incorporation of chickpea as green manure for radish. The yield and quality of radish as influenced by green manure was studied.

MATERIALS AND METHODS

An experiment was carried out in completely randomized design with three replications to assess the effect of chickpea as a green manure on the yield and quality of radish. There were fifteen treatments in different dosages using fresh,composted and vermicomposted parthenium and poultry droppings.

The chickpea plants were incorporated into the same soil after harvesting. It was left for a month with adequate moisture. Then radish was grown in them.

The chickpea were grown with following treatments

T_0 - Control – Red loamy soil (7 kg)
T_1 - Fresh *Parthenium* @ 35 g per pot
T_2 - Composted *Parthenium* @ 26.25 g per pot

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TABLE 1: Effect of incorporation of chickpea as green manure on yield components of *Raphanus sativus*

Treatments	Bettle length (cm)		Bettle diameter (cm)		Bettle weight (g)	
	45 DAS	60 DAS	45 DAS	60 DAS	45 DAS	60 DAS
T_0	5.53	6.67	3.37	6.20	5.67	9.67
T_1	7.07	10.23	5.50	10.37	10.33	50.00
T_2	7.76	8.67	6.43	10.47	42.33	42.33
T_3	6.40	7.93	6.57	10.53	27.00	46.00
T_4	7.73	10.93	7.67	10.10	25.67	55.00
T_5	7.63	10.90	8.63	8.77	28.33	46.00
T_6	10.33	9.90	7.67	9.40	28.00	42.67
T_7	8.23	8.57	7.67	10.30	20.00	43.33
T_8	6.37	9.67	7.23	10.40	15.00	59.00
T_9	9.17	9.33	8.27	9.50	30.67	44.00
T_{10}	8.93	9.43	7.57	12.17	32.33	80.00
T_{11}	7.57	9.00	7.77	9.97	28.67	46.67
T_{12}	6.87	8.43	5.97	10.93	12.67	58.33
T_{13}	6.57	8.37	6.57	10.90	17.00	50.00
T_{14}	7.86	8.63	7.07	10.07	22.33	53.33
T_{15}	5.80	6.73	5.73	7.97	9.00	28.33
SEd	0.85	1.10	1.04	1.03	3.50	NS
CD (5%)	1.74**	2.25**	2.12**	2.09**	7.14**	

SEd-Standard error deviation ; CD-Critical difference ; DAS-Days after sowing

T_3 - Composted *Parthenium* @ 35.0 g per pot
T_4 - Composted *Parthenium* @ 43.75 g per pot
T_5 - Vermicomposted *Parthenium* @ 26.25g per pot
T_6 - Vermicomposted *Parthenium* @ 35.0g per pot
T_7 - Vermicomposted *Parthenium* @ 43.75 g per pot.
T_8 - Poultry droppings @ 35.0 g per pot
T_9 - Composted poultry droppings @ 26.25g per pot
T_{10} - Composted poultry droppings @ 35.0 g per pot
T_{11} - Composted poultry droppings @ 43.75g per pot
T_{12} - Vermicomposted poultry droppings@ 26.25g per pot
T_{13} - Vermicomposted poultry droppings@ 35.0g per pot
T_{14} - Vermicomposted poultry droppings @ 43.75g per pot
T_{15} - N: P: K (60:30:30 kg/ha)

Yield components

Bettle length of a radish is measured with a scale and expressed in cm. The diameter of a bettle was measured using a thread and recorded in cm. The weight of a bettle was measured and expressed in g. The protein content was estimated following the method of Lowry et al.[2] and ascorbic acid by the method of Sadasivam and Theymoli[3].

Statistical analysis of the data

The data collected from the different studies were subjected to statistical analysis as per the procedure outlined by Panse and Sukhatme[4].

RESULTS AND DISCUSSION

The yield components namely bettle length, bettle diameter and bettle weight were observed on 45 and 60 DAS (TABLE 1). The protein and ascorbic acid in the bettle were tested on 60 DAS(TABLE 2).

Significantly longer bettles were obtained in T_6 (10.33 cm) and T_9 (9.17 cm) compared to control (5.53 cm) on 45 DAS. On 60 DAS, the long bettles were observed in T_4 (10.93 cm) and T_8 (9.67 cm) and the shortest bettle was recorded in control (6.67 cm).

TABLE 2 : Effect of incorporation of chickpea as green manure on protein and ascorbic acid content of *Raphanus sativus*

Radish 60 DAS (green manured)		
Treatments	Protein	Ascorbic acid
T_0	1.48	869.87
T_1	1.99	1432.00
T_2	2.02	1622.93
T_3	1.73	1336.53
T_4	1.92	1264.93
T_5	2.14	1837.73
T_6	1.71	1694.53
T_7	1.89	1479.73
T_8	2.14	1050.13
T_9	1.69	1288.79
T_{10}	2.21	954.67
T_{11}	2.38	1336.53
T_{12}	2.20	1646.80
T_{13}	2.59	1455.87
T_{14}	2.33	1312.67
T_{15}	2.13	1479.73
SEd	0.14	115.82
CD (5%)	0.29**	236.53**

The greater diameter of bettles were seen in T_5 (8.63 cm) and T_9 (8.27 cm) and lower value in T_0 (3.37 cm) on 45 DAS. On 60 DAS, the bettle diameter was more in T_{10} (12.17 cm) and T_3 (10.53 cm) compared to control (6.20 cm)

T_2 (42.33 g) and T_{10} (32.33 g) recorded the maximum bettle weight and the control exhibited minimum weight of 5.67 g on 45 DAS.

The protein content was higher in T_{13} (2.59 mg g^{-1}) and T_5 (2.14 mg g^{-1}) compared to the control (1.48 mg g^{-1}) .Ascorbic acid level was more in bettles from T_5 and T_{12} (1837.73 and 1646.80 mg g^{-1}) compared to control (869.87 mg g^{-1})

Incorporation of sunhemp (*Crotalaria juncea*) improved wheat (*Triticum aestivum*) yield (Morabad et al., 1972)[5]. This may be due to more succulent nature of sunnhemp and its quick decomposition in the soil. *Sesamum* rotated with groundnut (*Arachis hypogea*) or horsegram (*Dolichos biflorus*) registered higher yield. Legumes supply N required by other crops. Judicious inclusion of legumes in crop rotations is desirable for maintenance of soil fertility[6].

Maurya and Dhar[7] reported that tubers of potato (*Solanum tuberosum*) produced by application of water hyacinth (*Eicchornia crassipes*) along with German slag were rich in vitamin-A, B and C in the first as well as in the residual crop. Water hyacinth (*Eicchornia crassipes*) with bone meal produced tubers rich in protein content in the first as well as in the second crop. The more uptake of nutrients in balanced form under water hyacinth (*Eicchornia crassipes*) with phosphate may be due to healthy root system.

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