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PRODUCTIVITY AND ECONOMICS OF SUMMER GREENGRAM [*Vigna radiata* (L.) Wilczek] AS INFLUENCED BY DIFFERENT ORGANIC MANURE AND ORGANIC SPRAYS

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ABSTRACT

A field experiment was conducted during summer, 2017 at agricultural college farm, Tirupati to study the effect of organic manures and organic sprays on the productivity and economics of summer greengram. The results revealed that poultry manure recorded highest seed and haulm yield of summer greengram. compared to remaining treatments. Among the organic sprays panchagavya spray resulted higher seed and haulm yield of greengram. Higher gross and net returns and B:C ratio were realized with poultry manure and panchagavya spray compared to control.

KEYWORDS: Organic manure, economics, panchagavya, seed yield.

India grows nearly 23.55 m hectares of pulses with an annual production of 17.15 m tones and an average productivity of 728 kg ha^{-1}. In Andhra Pradesh, it is cultivated in 1.04 m hectares with a production of 0.95 m tonnes and with a productivity of 911 kg ha^{-1} (Indiastat, 2015). Every 100 g of edible portion of greengram seed contains 75 mg calcium, 4.5 mg phosphorus, 24.5 g protein and 348 kilo calories of energy. Thus, increase in production of this crop can meet the expectations of the food policy makers and nutrition planners (Kramany *et al*., 2001).

In general both under rainfed and irrigated conditions, crops are grown during *kharif* to utilize the rainfall and in *rabi* to use residual moisture, leaving summer fallow, where the fields would remain fallow for 3 to 4 months from February to April. Looking into the lurking opportunity, summer greengram can be introduced into the cropping system to meet the demand of pulses.

Summer greengram can be introduced into the cropping system as it takes only 60 to 65 days to maturity, so the extra short duration varieties fit in very well within the available sowing window. It is grown solely on the available residual moisture and with the involvement of least farm inputs. Summer greengram has fast growing habit without much agronomic care and management, weed problems are also well taken care of, mainly on account of its smothering growth habit and ground covering ability well within two to three weeks from the time of sowing.

Heavy use of chemicals in agriculture has weakened the ecological base in addition to degrading the soil, water resources and quality of the food. At this juncture, a keen awareness has sprung on the adoption of 'Organic Farming' as a remedy to cure the ills of modern chemical agriculture. Organic farming is gaining importance in recent years as it sustains crop production as well as environment.

Greengram is highly responsive to nutrients. Nutrient application is essentially required to improve growth and yield of greengram. FYM, vermicompost and poultry manure not only increase organic carbon status of the soils but also increase the soil water holding capacity, flocculation of soil and availability of all micro and macro nutrients, thus improve the soil and crop production. It also enhances the activity of microorganism in soils which further enhance solubility of nutrients and their consequent availability (Chhonkar, 2002). Panchayagavya and jeevamrutha which are organic, has a potential to play the role in promoting growth and providing immunity in plant system. The use of panchagavya and jeevamrutha not only provides the nutrients but also hydrates the leaf cells, improves the chlorophyll content thus increase the photosynthetic activity. As they contain nutrients, growth promoting hormones and naturally occuring, beneficial, effective micro-organisms predominantly, lactic acid bacteria, yeast, actinomycetes, photosynthetic bacteria and certain fungi besides beneficial and proven fertilizers such as *Azotobacter, Azospirillum* and phospho bacterium

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Table 1. Seed yield and haulm yield (kg ha^{-1}) of greengram as influenced by different organic manures and organic sprays

Treatments	Seed yield	Haulm yield
Organic manures		
M_1	444	1023
M_2	642	1635
M_3	670	1816
M_4	726	1852
SEm±	8.9	27.5
CD (P=0.05)	31	95
Organic sprays		
S_1	529	1482
S_2	672	1642
S_3	660	1620
SEm±	5.6	17.4
CD (P=0.05)	17	52
Interaction		
S at M		
SEm±	15.5	47.6
CD (P=0.05)	N.S	N.S
M at S		
SEm±	12.9	39.6
CD (P=0.05)	N.S	N.S

which have the beneficial effect especially in improving soil health, growth and yield of crops.

MATERIAL AND METHODS

The field experiment was conducted during summer season of 2017 at S.V.Agricultural College Farm, Tirupati. The experimental soil was sandy loam in texture, neutral in reaction (pH 6.8), low in organic carbon (0.38 per cent) and available nitrogen (150 kg ha^{-1}), medium in available phosphorus (12 kg ha^{-1}) and high in available potassium (161 kg ha^{-1}).

The experiment was laid out in split plot design with three replications. The main plot consisted of four treatments of organic manures *viz.,* Control (M_1), Farm yard manure (M_2), Vermicompost (M_3) and Poultry manure (M_4) and sub plots consisted three treatments of organic sprays *viz.,* Control (S_1), Panchagavya (S_2) and Jeevamrutha (S_3).

The scheduled organic manures were thoroughly incorporated in to the soil 15 days prior to sowing of crop. Panchagavya is prepared one month before application and jeevamrutha is prepared 2-5 days before application

Table 2. Gross returns, net returns (ha^{-1}) and B:C ratio of greengram as influenced by different organic manures and organic sprays

Treatments	Gross returns	Net returns	B : C ratio
Organic manures			
M_1	27,683	12,440	1.79
M_2	40,343	19,989	1.99
M_3	42,016	10,824	1.30
M_4	45,429	27,936	2.56
SEm±	577.7	411.4	0.044
CD (P=0.05)	1,994	1420	0.15
Organic sprays			
S_1	33,235	14,173	1.80
S_2	41,962	19,831	1.99
S_3	41,406	19,389	1.94
SEm±	353.7	302.7	0.031
CD (P=0.05)	1,060	907	0.09
Interaction			
S at M			
SEm±	1000.7	712.7	0.077
CD (P=0.05)	2,281	1,927	0.20
M at S			
SEm±	817.0	643.2	0.068
CD (P=0.05)	2,634	2,047	0.21

and sprayed 10 days after sowing to 10 days before harvest.

RESULTS AND DISCUSSION

The higher seed yield (726 kg ha^{-1}) was recorded with the poultry manure, which was higher than remaining treatments (Table 1) The next best treatment was vermicompost which was however comparable with farm yard manure but significantly higher than the control and regarding the haulm yield highest was produced with poultry manure which was however, comparable with vermicompost. The next best treatment was farm yard manure. The lowest haulm yield was recorded with control. Higher seed yield and haulm yield might be accounted to the increased supply of almost all plant essential nutrients by translocation of photosynthates accumulated under the influence of the source of organic nutrients. Further, the translocation and accumulation of photosynthates in the economic sinks thus increased yield attributes, chlorophyll content and nitrate reductase activity resulted in increased grain yield. The same was obvious through the findings of Yadav *et al.* (2007), Rao *et al.* (2013) and Singh *et al*. (2015)

As regards the organic sprays, highest seed and haulm yield was recorded with panchagavya, which was at par with jeevamrutha with no significant difference between them, lowest seed and haulm yield was recorded with control. Higher seed yield and haulm yield might be due to IAA and GA present in panchagavya when foliar sprays were done could have created stimuli in the plant system which in turn increased the production of growth regulators in cell system and the action of growth regulators in plant system stimulated the necessary growth and development coupled with better translocation and accumulation of photosynthates from source to sink increased the grain yield. Similar results were obtained by Somasundaram *et al.* (2007), Swaminathan *et al.* (2007), Chaudhari *et al.* (2013) and Yadav and Tripathi (2013).

The higher gross returns were obtained with the poultry manure tried, which was superior to all other treatments. The next best treatment was vermicompost, which was however comparable with farm yard manure. Control resulted in the lowest gross returns. Poultry manure produced the highest net returns and B : C ratio which was significantly superior to all other treatments. This was followed by farm yard manure and the next best treatment was control. The lowest net returns and B : C ratio was observed with vermicompost. Highest gross returns might be because of better nutrition to the crop due to steady application of organic sprays resulting in higher grain and haulm yield. Similar findings were reported by Yadav and Tripathi (2013) and Rao *et al.* (2013).

With regard to the organic sprays, the higher gross returns, net returns and B:C ratio were recorded with panchagavya, which was at par with jeevamruta. Lowest gross returns were obtained with control. Higher gross returns might be because of better nutrition to the crop due to steady application of organic (Table .2) sprays resulting in higher grain and haulm yield. Similar findings were reported by Yadav and Tripathi (2013) and Rao *et al.* (2013).

Hence it can be concluded the higher productivity and economics of summer greengram can be realized with the application of poultry manure and panchagavya is more suitable for southern Agro-climatic zone of A.P.

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