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Evaluation of Little Millet based Intercropping Systems under Rainfed Conditions

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A B S T R A C T

A field experiment was conducted during *kharif*, 2019 on sandy loam soils of dryland farm of S.V. Agricultural College, Tirupati campus of Acharya N.G. Ranga Agricultural University. The results of the experiment revealed that among the different intercropping systems, little millet + greengram (4:2) (T_6) recorded significantly higher plant height, leaf area index, dry matter production followed by little millet + cowpea (4:2) (T_7). Lower values of these growth parameters were recorded with little millet + cluster bean (4:2) (T_8). Maximum number of tillers m^{-2}, panicles m^{-2}, panicle weight and test weight were registered with intercropping system of little millet with greengram (4:2) (T_6) followed by little millet + cowpea (4:2) (T_7). Higher grain and straw yield were recorded with little millet + greengram (4:2) (T_6) and the lower values were obtained with little millet + cluster bean (4:2) (T_8). As regards to sole and intercropping systems, higher little millet grain and straw yield was recorded with sole little millet (T_1).

Introduction

Millets are a traditional staple food of the dryland regions of the world. The world production of millets was 26.7 million tonnes from an area of 33.6 million hectare whereas, in India millets are grown in an area of 17 million hectares with an annual production of 18 million tonnes and contribute 10 per cent to the country's food grain basket (Department of Agriculture Cooperation and Farmers Welfare, 2017). In recent years, there has been an increasing importance of millets as a substitute for major cereal crops in human diet.

Millets have the potentiality of contributing to increased food production both in developing and developed countries. On an average, millet grain contains 7-12 % protein, 2-5 % fat, 15-20 % dietary fibre and 65-75 % carbohydrates. Millets have high proportion of non-starchy polysaccharides and dietary fibre which help in prevention of constipation, lowering of blood cholesterol, slow release of glucose into the blood stream during digestion, lower the incidence of cardiovascular diseases, duodenal ulcer and hyperglycemia (diabetes) are reported, among regular millet consumers. Little millet is one

of the small millets gaining importance due to it's beneficial effects. Little millet is native to India and is called Indian millet. It is quick growing, short duration crop and can withstand both drought and water logging. It is an important catch crop in some tribal farms in India. Little millet is another reliable catch crop in view of its earliness and resistance to adverse agro-climatic conditions. The stover is a good fodder for cattle.

Materials and Methods

The field experiment was conducted during *kharif*, 2019 at dryland farm of S. V. Agricultural College, Tirupati campus of Acharya N. G. Ranga Agricultural University, Andhra Pradesh. The soil of experimental site was sandy loam having 0.24 % organic carbon, 173.9 kg ha^{-1}, 16.23 kg ha^{-1} and 177.8 kg ha^{-1} of available N, P_2O_5 and K_2O respectively. A total rainfall received during the crop period was 712.8 mm received in 37 rainy days. The experiment was laid out in a randomized block design with nine treatments comprised of sole little millet (T_1), sole greengram ($T_{2)}$, sole cowpea (T_3), sole cluster bean (T_4), sole groundnut (T_5), little millet + greengram (4:2) (T_6), little millet + cowpea (4:2) (T_7), little millet + cluster bean (4:2) (T_8) and little millet + groundnut (4:2) (T_9) (Table 1). Little millet as well as intercrops were sown in lines, 30 cm apart by adopting all the standard package of practices. Both the sole and intercrops were fertilized separately as per the recommendation. The scheduled nitrogen was applied in two equal splits viz., first half at the time of sowing as basal and remaining half as top dressing at 30 DAS. Growth parameters *viz*., plant height, leaf area index, dry matter production and number of tillers m^{-2} were recorded at 20, 40, 60 DAS and at harvest. Yield attributes *viz*., number of $panicles^{-2}$, panicle weight and test weight were recorded from the net plot. Grain and straw yield were recorded based on the yield obtained from net plot.

Results and Discussion

Growth parameters like plant height, leaf area index and dry matter production was significantly affected by intercropping. Sole little millet (T_1) recorded higher plant height, leaf area index and dry matter production. Among the intercropping systems tried, plant height of little millet was found to be higher at all the stages under the treatment, little millet + greengram (4:2) (T_6) followed by little millet + cowpea (4:2) (T_7) (Table 1). Similar results were also obtained by Kumar *et al.*, (2009), Choudhary *et al.*, (2012), Tripathi and kushwaha (2013), Pradhan *et al.*, (2014) and Manjunath and Salakinkop (2017).

Table.1 Effect of intercropping systems on growth parameters of little millet

Treatments	Plant height (cm)	Leaf area index	Dry matter production (kg ha^{-1})
T_1 : Sole little millet	124	2.50	3021
T_2 : Sole greengram	-	-	-
T_3 : Sole cowpea	-	-	-
T_4 : Sole cluster bean	-	-	-
T_5 : Sole groundnut	-	-	-
T_6 : Little millet + Greengram (4:2)	122	2.43	2829
T_7 : Little millet + Cowpea (4:2)	119	2.36	2799
T_8 : Little millet + Cluster bean (4:2)	108	2.23	2510
T_9 : Little millet + Groundnut (4:2)	117	2.28	2544
SEm±	3.5	0.07	59
CD (P=0.05)	10	0.21	178

Table.2 Effect of intercropping systems on yield attributes of little millet

Treatments	No. of panicles m^{-2}	Panicle weight (g)	Test weight (g)	Grain yield (kg ha^{-1})	Straw yield (kg ha^{-1})
T_1 : Sole little millet	153	2.94	2.64	1538	1903
T_2 : Sole greengram	-	-	-	-	-
T_3 : Sole cowpea	-	-	-	-	-
T_4 : Sole cluster bean	-	-	-	-	-
T_5 : Sole groundnut	-	-	-	-	-
T_6 : Little millet + Greengram (4:2)	142	2.87	2.61	1302	1584
T_7 : Little millet + Cowpea (4:2)	137	2.83	2.59	1196	1465
T_8 : Little millet + Cluster bean (4:2)	129	2.78	2.55	1128	1349
T_9 : Little millet + Groundnut (4:2)	135	2.81	2.57	1152	1434
SEm±	5.0	0.03	0.02	52.5	59.8
CD (P=0.05)	15	0.09	NS	157	179

The yielding ability of a crop is reflected through its yield attributing characters. The yield attributes of little millet like number of panicles m^{-2}, panicle weight and test weight were found to be increased when intercropped with greengram (4:2) (T_6) (Table 2). This might be due to development of better complementary relationship and non-renewable resources like water, nutrients and incoming sunlight. Similar pattern was observed by Kumar *et al.,* (2009) and Ansari *et al.,* (2011).

Grain and straw yield of little millet was significantly affected due to the different intercropping systems. Higher values of grain and straw yields were realized with sole little millet (T_1). Among the intercropping systems, little millet + greengram (T_6) recorded significantly higher grain and straw yield of little millet followed by little millet + cowpea (T_7), while little millet + cluster bean (T_8) registered lower grain and straw yield. The results are corroborating with the findings of Kumar *et al.,* (2009) and Choudhary *et al.,* (2012).

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