



Research Article

EFFECT OF GROUNDNUT BASED MILLETS INTERCROPPING SYSTEM ON GROWTH AND YIELD OF GROUNDNUT (*Arachis hypogaea* L.) UNDER RAINFED CONDITION

SHWETHANJALI K.V.¹, KUMAR NAIK A.H.^{2*}, BASAVARAJ NAIK T.³ AND DINESH KUMAR M.⁴

^{1,4}Department of Agronomy, College of Agriculture, University of Agricultural and Horticultural Sciences, Shivamogga, 577 204, India

²Principal Investigator, All India Coordinated Research Project on Groundnut, Hiriya, University of Agricultural and Horticultural Sciences, Shivamogga, 577 204, India

³Senior Farm Superintendent, Zonal Agricultural and Horticultural Research Station, University of Agricultural and Horticultural Sciences, Shivamogga, 577 204, India

*Corresponding Author: Email - kumarahphd@gmail.com

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Abstract: A field experiment was conducted during Kharif 2017 at Zonal Agricultural and Horticultural Research Station, Babbur farm, Hiriya to study the effect of groundnut based intercropping system on growth and yield parameters of groundnut (*Arachis hypogaea* L.) under rainfed condition. Treatments consisted of testing of pure groundnut against intercropping of finger millet, little millet and foxtail millet at 5:2 and 6:1 row proportions. Growth parameters such as plant height (34.14 cm), number of branches (10.52), number of leaflets (79.33), leaf area (1265 cm² plant⁻¹) and total dry matter accumulation (28.81 g plant⁻¹) were significantly higher in the intercropping of groundnut + foxtail millet with 6:1 row proportion. Results of experiment indicated that higher groundnut pod and haulm yield was recorded in sole groundnut (1862 kg ha⁻¹ and 2618 kg ha⁻¹, respectively). Among the intercropping treatments, significantly higher pod and haulm yield (1744 kg ha⁻¹ and 2194 kg ha⁻¹, respectively), number of pods (26.46), pod weight per plant (13.09) and groundnut equivalent yield (1877 kg ha⁻¹) were recorded in groundnut + foxtail millet in the row proportion of 6:1.

Keywords: Groundnut, Millets, Intercropping

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Introduction

Groundnut, one of the important oilseed crop of tropical and sub-tropical regions of the world belongs to the family Leguminosae and it is known as the 'king of oilseed' crops. Groundnut is also called poor man's almond. It is one of the food and economic crop of our country. The area under groundnut in India is 49.07 lakh hectares, production of 82.16 lakh tonnes with a productivity of 1674 kg ha⁻¹. Gujarat accounts about 41.35 per cent of the total production of groundnut and it is the largest producer in India followed by Rajasthan (13.76 %), Andhra Pradesh (12.28 %), Tamil Nadu (10.55 %), and Karnataka (5.14%) (Anon., 2018). In Karnataka, it is grown in an area of 5.80 lakh ha with a production of 4.23 lakh tonnes and a productivity of 729 kg ha⁻¹ [1]. This is very low when compared to the national productivity because mainly grown under rain fed conditions and energy starved marginal lands which are prone to the vagaries of monsoon. Inadequate and erratic rainfall coupled with damage by insect pest results in low yield and in extreme cases complete failure of the crop. Millets are hardy and resilient crops grown in diverse agro-climatic adverse condition, which have been contributing to the food security with important role in the livestock dependent communities for their livelihood. Therefore, intercropping of groundnut and millets was undertaken to study the effect of intercropping system on growth and yield of groundnut under rain fed condition as intercropping is one of the important cropping systems recommended to mitigate the aberrant climatic conditions [2] which aims to increase total productivity per unit area through equitable and judicious use of land resource and farming inputs including labours.

Material & Methods

The field experiment was conducted at Zonal Agricultural and Horticultural Research station, Babbur farm, Hiriya during kharif 2017 under rain fed condition.

The station is situated at 13° 57' 32" North latitude and 70° 37' 38" East longitude and an altitude of 606 meters above mean sea level (MSL). The soil of the experimental site is vertisol with slightly alkaline pH (8.10), organic carbon (1.90 g kg⁻¹), available nitrogen (258 kg ha⁻¹), available phosphorus (35 kg ha⁻¹) and available potassium (315 kg ha⁻¹). Intercropping of millets like finger millet (ML-365), little millet (Sukshema) and foxtail millet (HMT 100-1) with groundnut (G-252) in 5:2 and 6:1 row proportion on vertisols was studied under rainfed condition. The treatments included in the experiment were T₁: Sole groundnut, T₂: Sole finger millet, T₃: Sole little millet, T₄: Sole foxtail millet, T₅: Groundnut + finger millet (5:2), T₆: Groundnut + little millet (5:2), T₇: Groundnut + foxtail millet (5:2), T₈: Groundnut + finger millet (6:1), T₉: Groundnut + little millet (6:1) and T₁₀: Groundnut + foxtail millet (6:1).

Results & Discussion

Growth and yield parameters of groundnut in sole and intercropping treatments varied significantly. Among various treatments significantly higher plant height (34.14 cm), number of branches (10.52), number of leaflets (79.33), leaf area (1265 cm² plant⁻¹) and total dry matter accumulation (28.81 g plant⁻¹) were recorded in intercropping of groundnut + foxtail millet with 6:1 row proportion. This could be due to better utilization of resources, space availability between the rows of groundnut for proper distribution of light, space and nutrients, reduced competition for the same resources. These results were in accordance with the findings of Maitra et al. (2001) and Shiva Kumar and Yadahalli (1996) [3,4]. Among various treatments significantly higher groundnut pod (1,862 kg ha⁻¹) and haulm yield (2618 kg ha⁻¹) were recorded in sole groundnut. This might be due to higher plant population and competition free environment as compared to intercropped groundnut. Similar results were reported by Shalim Uddin et al. (2003) [5].

Table-1 Growth parameters of groundnut as influenced by groundnut-based millets intercropping system

Treatments	Plant height (cm)	No. of branches plant ⁻¹	No. of leaflets plant ⁻¹	Leaf area (cm ² plant ⁻¹)	Total dry matter accumulation (g plant ⁻¹)
T1: Sole groundnut	25.15	6.98	57.11	932	23.20
T2: Sole finger millet		7.49	70.40	1147	23.56
T6: Groundnut + little millet(5:2)	30.74	8.93	71.70	1150	24.21
T7: Groundnut + foxtail millet(5:2)	32.24	9.70	74.63	1194	24.94
T8: Groundnut + finger millet(6:1)	32.94	9.71	76.36	1220	25.85
T9: Groundnut + little millet(6:1)	33.73	10.02	78.32	1250	28.07
T10: Groundnut + foxtail millet(6:1)	34.14	10.52	79.33	1265	28.81
S.Em±	0.97	0.39	2.39	35.82	1.26
CD at 5 %	2.98	1.20	7.36	110.4	3.89

Table-2 Yield and yield parameters of groundnut as influenced by groundnut-based millets intercropping system

Treatments	Number of pods plant ⁻¹	Pod weight (g plant ⁻¹)	Groundnut pod yield (kg ha ⁻¹)	Groundnut haulm yield (kg ha ⁻¹)	Groundnut equivalent Yield (kg ha ⁻¹)
T1: Sole groundnut	21.13	11.14	1862	2618	1862
T2: Sole finger millet	-	-	-	-	1152
T3: Sole little millet	-	-	-	-	619
T4: Sole foxtail millet	-	-	-	-	641
T5: Groundnut + finger millet(5:2)	21.64	11.29	1290	1763	1683
T6: Groundnut + little millet(5:2)	22.22	11.47	1334	1804	1569
T7: Groundnut + foxtail millet(5:2)	23.99	12.00	1486	1957	1717
T8: Groundnut + finger millet(6:1)	24.28	12.09	1590	2042	1809
T9: Groundnut + little millet(6:1)	25.71	12.52	1683	2136	1822
T10: Groundnut + foxtail millet(6:1)	26.46	13.09	1744	2194	1876
S.Em±	0.50	0.36	94.62	82.2	89.18
CD at 5 %	1.54	1.11	285.8	253.3	264.97

Among the intercropping treatments, groundnut + foxtail millet (6:1) recorded significantly higher groundnut pod, haulm and groundnut equivalent yield (1,744 kg ha⁻¹, 2,194 kg ha⁻¹ and 1,876 kg ha⁻¹, respectively) which was on par with the groundnut + little millet (1,683 kg ha⁻¹, 2,136 kg ha⁻¹ and 1,822 kg ha⁻¹, respectively) and groundnut + finger millet (1,590 kg ha⁻¹, 2,042 kg ha⁻¹ and 1810 kg ha⁻¹, respectively) under same row ratio. This might be due to higher yield of groundnut in the intercropping system and thereby envisages effective utilization of the resources along with millets. Similar findings have been reported by Shiva Kumar and Yadahalli (1996). Yield of any crop depended on its yield parameters. Significantly higher number of pods and pod weight plant⁻¹ were recorded under groundnut intercropped with foxtail millet (26.46 and 13.09 g, respectively) at ratio of 6:1 followed by little millet (25.71 and 12.52 g, respectively) and finger millet (24.28 and 12.09 g, respectively). This mainly due to variation in translocation of photosynthates from source to sink as there is a greater availability of light due to differential growth habit and its efficient use, less competition for resources by component crops and efficient utilization of available resources. Similar findings have been reported by Maitra *et al.* (2001) and Bassi and Dugje (2015) [6,7].

Conclusion

The present study clearly indicates that intercropping of groundnut + foxtail millet at 6:1 row ratio is the best combination for getting higher yield followed by groundnut + little millet under same row ratio.

Application of research: Study of intercropping of groundnut

Research Category: Intercropping System

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***Principle Investigator or Chairperson of research:** Dr A.H. Kumar Naik

University: University of Agricultural and Horticultural Sciences, Shivamogga, 577 204, India

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