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## Influence of sorghum + soybean intercropping on sorghum productivity

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### Abstract

The experiment was carried out during the *Kharif* season at Sorghum Research Station, Parbhani. The said experiment was laid out in Randomized Block design with intercropping of sorghum + soybean crop with different row ratio *viz.* 2:1, 3:3, 4:2 and 6:3 of sorghum and soybean with objective to find out correct or suitable row ratio of sorghum + soybean intercropping system. Sorghum yield in sole treatment produced less yield and returns compared to the intercropping system. Highest soybean yield was recorded in 3:3 row ratio and sorghum equivalent yield was in 6:3 row which is overall best performed row ratio.

**Keywords:** Sorghum, soybean and row ratio

### Introduction

Nearly 78% i.e. 62 million tons of the world's sorghum production and 89% i.e. 45 million ha area of Jowar crop is located in the developing regions. In the world Asia region is the major region of sorghum crop nearly 12 Mha or 28% of the global (Anonymous, 2009) [2]. Sorghum area under cultivation in country was during *kharif* 1.9 million ha, Rabi 3.0 million ha and production was 2.0 mt during *kharif* and 2.7 mt during *rabi* season respectively. Sorghum is double purpose crop for grain and fodder. In dry areas of state this crop is suitable with fulfilling needs both home and farm.

In tropical and sub-tropical areas of world among small-scale farmers intercropping is popular due to its sustenance. (Wahua & Miller 1978) [5]. Due to gambling of weather condition in India assured yield from field crop expected by the farmers. Hence depending on single crop is risky in today's condition. In Maharashtra state of India due to climate change or shifting in monsoon occurrence farmers are facing problems with single crop. And uneven distribution of rainfall is again a reason for changing cropping pattern of the area. As in Marathwada region of Maharashtra intercropping plays a key role for maximizing crop and sustaining crop productivity (Willey, 1979) [6]. Different management variable can influence the efficiency of a sorghum/soybean or cereal/legume intercrop system is component crop density using variable row management (Ofori & Stern, 1987) [4]. The major objective of intercropping are to produce an extra yield, to optimize the use of natural resources and to stabilize the yield of field crop.

### Materials and Methods

The study was carried out at Sorghum Research Station, Parbhani in randomized block design comprising of four row ratio of sorghum + soybean intercropping system and sole sorghum treatment. With spacing for sorghum 45 x 12 cm and for soybean 45 x 5 cm. Soybean cultivar was JS-335 and sorghum PKV-801. The soil of experimental site was having low organic carbon and available nitrogen, medium phosphorus and high potassium content. The experiment was conducted as rainfed and replicated thrice. All other recommended agronomic practices were followed. Recommended dose of fertilizers (80:40:40 NPK kg / ha) was applied. Intercrops were harvested at their physiological maturity.

### Results and Discussion

**Sorghum yield:** The data from given table reveal that sorghum yield was reduced as get intercropped with soybean crop reason may be reduction in plant population as compared to sole sorghum plant population.

But sorghum + soybean combined produce more yield than the sole sorghum crop. In different row ratios two ratio i.e. 2:1 recorded highest Jowar yield which was at par with 6:3 row ratio. Similar results was reported by at NRC Hyderabad. (Anonymous, 1997) <sup>[1]</sup>.

**Soybean yield:** Highest soybean yield was observed in 3:3 row proportion. Naturally due to higher soybean plant population than remaining row proportion.

The yield advantage may be due to 30 or 40 days maturity difference Baker & Yusuf (1976) <sup>[3]</sup>. In conducted experiment, the sorghum and soyabean crops both were sown simultaneously but harvesting of sorghum was done after soybean crop with a few weeks gap which may leads a sufficient supply of nutrient and residual moisture to sorghum crop. In each of the three years of experimentation, rainfall ended in October

**Sorghum grain equivalent yield:** Highest sorghum grain equivalent yield was observed in 6:3 row ratio (6884 kg/ha) which was at par with 2:1 row ratio but significantly higher than remaining row ratio and sole sorghum. Similar results in economic returns which clear from yield data.

**Table 1:** Sorghum and soybean yield as influenced by different intercropping row ratios

Treatment	Sorghum grain (Kg/ha)	Soybean (kg/ha)	Sorghum grain equivalent
T <sub>1</sub> 2:1	3397	664	6720
T <sub>2</sub> 3:3	2295	862	5852
T <sub>3</sub> 4:2	2769	589	5540
T <sub>4</sub> 6:3	3364	715	6884
T <sub>5</sub> Sole Sorghum	4038	---	5326
SE (m)+	76.67	52	123.33
CD @ 5 %	231	156	370

## Conclusion

Amongst different intercropping row ratio of sorghum + soybean intercropping system 6:3 row proportion is found suitable through yield and economic point.

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