

Production potential of legume based intercropping system under hyper arid condition of Rajasthan

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Abstract

Pearl millet intercropping with arid legumes (moth bean & clusterbean) under 4:1, 5:1 and 6:1 planting systems on sandy loam soil at experimental farm of CAZRI, Regional Research Station showed that the main crops (moth bean and clusterbean) as well as intercrop (pearl millet) recorded highest plant height under planting system 5:1. Highest grain yield and dry matter production of moth bean and clusterbean was obtained under 5:1 and 6:1 planting systems which were at par with 4:1 and 5:1 planting systems, respectively. Pearl millet under intercropping with moth bean and clusterbean in 5:1 planting system produced highest dry matter and grain yield. Highest grain yield to pearl millet equivalent (14.54 q/ha) was recorded under 5:1 planting system over rest of the systems.

Key words : Arid legume, pearl millet, intercropping, rainfed arid zone

Introduction

Poor and scanty rainfall, high evapo-transpiration, extreme temperature and poor soil base characterize arid northwestern Rajasthan. Crop production in this region is risky and crop yields are poor. Intercropping is proven system of sustainable agricultural production especially under rainfed conditions. this system is aimed at increasing productivity per unit area, insurance against total crop failure under aberrant weather conditions [1] and balance utilization of nutrients and other natural resources. This advantage can be achieved by simple expedient of growing crop together [2]. Planting ratio have important effects on the balance of competition between crops and their productivity. Keeping in view, an investigation was undertaken to find out optimum row ratio of arid legumes and pearl millet intercropping under arid rainfed condition to achieve maximum productivity.

Materials and methods

The experiment was carried out during kharif of 2003 at CAZRI, Regional Research Station, Bikaner (Rajasthan). The soil was sandy loam with pH of 8.5 having 75, 12 and 220 Kg/ha available N, P and K, respectively. The treatment consisted of intercropping of pearl millet with two arid legumes (mothbean and Clusterbean) in three planting systems (4:1, 5:1 and 6:1). The experimental design was Randomized Block Design with three replication. The rainfall during crop season was 178.6 mm. The cultivars used were 'RMO-40, RGC-936 and HHB-67 for mothbean, clusterbean and pearl millet, respectively. The main crops like: moth bean and clusterbean were grown at 30 cm apart from row to row along with intercropping of one row of pearl millet after 4,5 and 6 rows of arid legumes at same spacing.

Results and discussion

Growth of main and intercrops

Highest plant height of pearl millet and legumes were under 5:1 planting system. Pearl millet inter-cropping with clusterbean attains a better height than moth bean. The result showed that growth performance of moth bean and cluster bean as well as pearl millet was better under legume + pearl millet (5:1) system showing highest plant height of 18.27, 27.93 and 55.8 cm of moth bean, cluster bean and pearl millet, respectively (Fig. 1).

Grain yield

Planting ratio of component crops significantly affected grain yield of arid legumes. Moth bean performed better than clusterbean in term of grain