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Effect of intercropping of niger in *kharif* proso millet (*Panicum miliaceum* L.) with organic and inorganic sources of nutrients on yield, economics and intercropping indices

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ABSTRACT

Field experiment conducted at Dapoli revealed that, niger is more remunerative intercrop in proso millet, as it enhanced the growth and yield of proso millet. It should be grown in 3:1 row ratio with the application of inorganic sources of nutrients for obtaining higher yields. When niger is grown as intercrop in proso millet was found economically profitable with different row ratios and with the application of inorganic sources of nutrients over organic source. Proso millet + niger in 3: 1 row ratio recorded higher net returns followed by 2: 1 row ratio. Higher cost benefit ratio was recorded in 3: 1 row ratio (1.77) followed by 2: 1 row ratio (1.73). Crop indices such as land equivalent ratio was higher in 1: 2 and 1: 3 row ratio (1.41), proso millet equivalent yield was more in 1: 3 row ratio (57.02) when applied with inorganic sources of nutrients, followed by 3: 1 row ratio (56.01). Relative crowding coefficient of proso millet was higher in 3: 1 row ratio (4.69) indicating more proso millet yield than expected yield. Similar trend was observed in case of aggressivity. Crop performance ratio was improved in 1: 2 and 1: 3 row ratios (1.66).

Key words : Proso millet, Niger, Intercropping, Sources of nutrients, Yield, Cropping indices and economics

INTRODUCTION

Intercropping system is an age old practice of growing simultaneously two or more crops in the same piece of land at the same time or in the same season. It has been a common practice followed by the farmers of India, Africa, Sri Lanka and West Indies. The basic idea of intercropping is not only that two or more crop species grown together can exploit the resources better than either of them grown separately. But also when two or more crops occupy the same field, the inherent risk in agriculture and more so, under dry land conditions are buffered to some extent called as "biological insurance" (Ayyer, 1963).

Aiyer (1949) reported that the resources with regard to the plant nutrients present in the soil or added to it as manure were utilized to the fullest extent in mixed stand than when components were grown separately. The different crops having varying root depths extract moisture and nutrients from different soil layers. The periodical income and distribution of labour requirement throughout the year is of great help to poor cultivators.

Efficient utilization of nutrient, moisture, space and solar energy can be derived through mixed or intercropping system (Ayyer, 1963; and Francis and Heichel, 1973). Yield advantages in intercropping system are mainly because of differential use of growth resources by the component crop. The main way of complimentarity occur when the growth pattern of component crop differ in time. The yield advantage in intercropping system is associated with efficient use of environmental resources over time (Willey *et al.*, 1985).

MATERIALS AND METHODS

The field experiment was conducted at the Agronomy farm Dr. B.S. Kokan Krishi Vidyapeeth, Dapoli Maharashtra during the *kharif* season of 2007-2008, on red lateritic soil of Konkan region. The farm is located in tropical region on 17^0 N latitude and 73^0 E longitude at an elevation of 250 meter above the mean sea level. The variety used for experiment was Vari No. 10 and JNC-6 for proso millet and niger, respectively. The treatments consisted of five row ratios (1:1, 2:1, 3:1, 1:2, 1:3) along with sole crop of proso millet and niger and two resources of nutrient *i.e.* organic (5 t ha^{-1} through FYM (W1) and inorganic (50% of recommended N and 100 % of P + K through sampurna (19:19:19) and remaining 50 % N top dressed through urea (W2)). There were 14 treatment combinations replicated thrice in randomized block design. The plot size was 4.8 x 3.6 meter. Seed rate were used 5 and 3 kg ha^{-1} for both the crops, respectively. The crop was raised by using all recommended agronomic practices.

Line sowing of proso millet was done in nursery with well prepared raised bed of size 5 x 1 meter. After 15 days 1 kg N for 100 sq. m. areas was given, and transplanting was done after 20 days on main plot leaving rows for niger sowing. On the same day niger was sown in line in main plots. During the period of experiment, total rainfall was received 4260 mm. from June to October. Growth, yield attributes and yield were studied

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