

environments in view of its above average stability for plant height, productive tillers and grain yield (Table 2,3)

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INTERCROPPING PEARL MILLET WITH PIGEONPEA UNDER RAINFED CONDITION

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ABSTRACT

Field experiments conducted during *kharif* seasons of 1986, 1987 and 1988 showed that intercropping of pearl millet and pigeonpea was better than raising pure crops as indicated by higher LER. It was higher with 1:1 ratio of pearl millet and pigeonpea. But the net return was the highest with pure crop of pigeonpea. Among the intercropping system, the net return was the highest with 1:2 ratio with coir pith and was followed by 1:3 ratio without coir pith. The ratio of 1:2 can be recommended considering both the LER and net return.

In India mixed cropping and intercropping are age old practices (Chowdhury, 1979). Crop mixtures or intercrops have several advantages such as risk distribution, better utilisation of labour, resources and natural endowments, better quality product and higher productivity and income. In Tamil Nadu, mixed cropping of sorghum and pigeonpea is common. But reduction in yield of pigeonpea due to intercropping of sorghum was reported (Saraf *et al.*, 1972). But several trials under All India Co-ordinated Research Project for Dryland Agriculture have shown that intercropping of pearl millet and pigeonpea had very high productivity and high return apart from giving staple food of millet and protein source (Chetty, 1983). Hence the present study was made to find out suitable intercropping system of pearl millet and pigeonpea for Tiruchirapalli region of Tamil Nadu.

MATERIAL AND METHODS

Field experiments were conducted at the Soil Salinity Research Centre, Tamil Nadu Agricultural

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University, Tiruchirapalli, during *kharif* of 1986, 1987 and 1988 under rainfed condition. The rainfall received during the cropping season are given in Table 1. The soil type was sandy loam with a pH of 8.2 and E_c 0.16 dSm^{-1} . Available N status was low and that of P and K were medium.

Pearl millet X5, a hybrid and pigeonpea Co 3, a short duration variety, were the test crops in 1986. Pearl millet Co6, and pigeonpea SA 1, a long duration variety, were the test crops in 1987 and 1988. Pearl millet and pigeonpea, were grown as pure and mixed stands with different ratios such as 1:1, 1:2, 2:1, 1:3 and 3:1. These treatments were tried with and without applications of coir dust 5 t ha^{-1} .

The experiment was conducted in randomised block design with three replications. A manurial schedule of 45 kg N, 22.5 kg P205 and 22.5 kg K20 were applied uniformly to all treatments splitting N alone into two. For comparison of treatments, landequivalent ratio (LER) was worked out based

Table 1. Rainfall received during the crop period

| Month | 1986-87 | | 1987-88 | | 1988-89 | |
|-----------|---------------|------------------|---------------|------------------|---------------|------------------|
| | Rainfall (mm) | Rainy days (No.) | Rainfall (mm) | Rainy days (No.) | Rainfall (mm) | Rainy days (No.) |
| August | 68.1 | 5 | 53.6 | 4 | 123.3 | 7 |
| September | 44.5 | 5 | 177.4 | 7 | 263.3 | 6 |
| October | 141.1 | 7 | 166.3 | 7 | 121.0 | 6 |
| November | 83.8 | 4 | 19.6 | 3 | 54.0 | 4 |
| December | 25.8 | 3 | 305.0 | 5 | 24.0 | 4 |
| January | 2.0 | - | - | - | - | - |
| Total | 365.3 | 24 | 721.9 | 26 | 585.6 | 27 |

on the grain yield of the crops. Economics of individual treatments was also worked out.

RESULTS AND DISCUSSION

In replacement series of intercropping, comparison of yield of individual crops (Table 2) will not be of any use. Hence the yield advantage of intercropping system was compared as LER (Table 3). Irrespective of the ratio of intercrops, the LER was high in intercropping system indicating the yield advantage over pure crops. This might be due to the complementary effect of pearl millet and pigeonpea. In general, the LER was high with 1:1 ratio of intercropping (Chetty, 1983) followed by 1:2 ratio. It might be due to better spatial arrangements of inter crops in the treatment, giving opportunity to each plant to grow better without competition. Invariably the LER was low with coir

dust application. This might be due to higher yield of pure crops especially pearl millet with coir dust application.

Economics of intercropping

Growing pure crop of pearl millet under rainfed condition was uneconomical with negative return or with very low net return (Table 4). On the other hand, pure crop of pigeonpea fetched very high net return of Rs. 3391/- per ha even without coirpith. With regard to intercropping, 1:2 ratio with coir pith had given the highest net return and was followed by 1:3 ratio without coir pith. Since pigeonpea was a high value crop, the higher proportion of this crop in the intercropping system had increased the net return.

Taking into consideration both the LER and the net return, intercropping of pearl millet and

Table 2. Grain yield of base crop and intercrop

| | 1986 | | 1987 | | 1988 | | Mean | |
|-------------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| | Base crop | Inter crop | Base crop | Inter crop | Base crop | Inter crop | Base crop | Inter crop |
| Without coir pith | | | | | | | | |
| PM Pure crop | 385 | - | 785 | - | 537 | - | 569 | - |
| PP Pure crop | - | 1000 | - | 1174 | - | 1089 | - | 1089 |
| PM + PP 1:1 ratio | 458 | 517 | 1015 | 579 | 602 | 393 | 692 | 496 |
| PM + PP 1:2 ratio | 429 | 307 | 950 | 748 | 530 | 463 | 636 | 506 |
| PM + PP 2:1 ratio | 593 | 202 | 965 | 412 | 605 | 271 | 721 | 295 |
| PM + PP 1:3 ratio | 248 | 346 | 795 | 913 | 478 | 582 | 507 | 614 |
| PM + PP 3:1 ratio | 510 | 159 | 1015 | 343 | 674 | 115 | 733 | 205 |
| With coir pith | | | | | | | | |
| PM Pure crop | 725 | - | 1160 | - | 630 | - | 838 | - |
| PP Pure crop | - | 1003 | - | 1098 | - | 963 | - | 1021 |
| PM + PP 1:1 ratio | 470 | 617 | 1025 | 395 | 649 | 505 | 715 | 539 |
| PM + PP 1:2 ratio | 507 | 317 | 1015 | 890 | 494 | 537 | 672 | 615 |
| PM + PP 2:1 ratio | 469 | 270 | 1035 | 377 | 689 | 271 | 731 | 306 |
| PM + PP 1:3 ratio | 522 | 362 | 800 | 720 | 412 | 515 | 578 | 566 |
| PM + PP 3:1 ratio | 623 | 214 | 1075 | 473 | 659 | 124 | 786 | 270 |

PM : Pearl millet; PP : Pigeonpea;

Table 3. LER of inter-cropping system of pearl millet and pigeonpea with and without coir dust

| Treatment PM + PP ratio | LER | | | |
|-------------------------------|------|------|------|------|
| | 1986 | 1987 | 1988 | Mean |
| Without coir dust | | | | |
| PM Pure | - | - | - | - |
| PP Pure | - | - | - | - |
| 1:1 | 1.71 | 1.78 | 1.48 | 1.66 |
| 1:2 | 1.42 | 1.87 | 1.41 | 1.57 |
| 2:1 | 1.42 | 1.59 | 1.38 | 1.46 |
| 1:3 | 0.99 | 1.79 | 1.42 | 1.40 |
| 3:1 | 1.49 | 1.60 | 1.36 | 1.48 |
| With coir dust | | | | |
| PM Pure | - | - | - | - |
| PP Pure | - | - | - | - |
| 1:1 | 1.24 | 1.25 | 1.73 | 1.41 |
| 1:2 | 1.01 | 1.69 | 1.52 | 1.41 |
| 2:1 | 1.07 | 1.24 | 1.41 | 1.24 |
| 1:3 | 1.06 | 1.35 | 1.37 | 1.26 |
| 3:1 | 1.05 | 1.36 | 1.19 | 1.20 |

PM: Pearl millet; PP: Pigeonpea

pigeonpea in the ratio of 1:2 with or without coir pith may be recommended under rainfed condition.

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Table 4. Net return from pearl millet and pigeonpea in pure and intercropping system with and without coir dust

| Treatment PM + PP ratio | Net return Rs. ha ⁻¹ | | | |
|-------------------------------|---------------------------------|------|------|------|
| | 1986 | 1987 | 1988 | Mean |
| Without coir dust | | | | |
| PM Pure | 770 | -129 | -37 | 201 |
| PP Pure | 2000 | 4585 | 3587 | 3391 |
| 1:1 | 1948 | 3385 | 1876 | 2403 |
| 1:2 | 1472 | 4237 | 2078 | 2596 |
| 2:1 | 1478 | 2457 | 1342 | 1759 |
| 1:3 | 1186 | 4769 | 2447 | 2801 |
| 3:1 | 1353 | 2187 | 750 | 1430 |
| With coir dust | | | | |
| PM Pure | 1450 | 354 | -76 | 576 |
| PP Pure | 2167 | 3869 | 2645 | 2894 |
| 1:1 | 2207 | 2194 | 2785 | 2395 |
| 1:2 | 1680 | 4849 | 2510 | 3013 |
| 2:1 | 1388 | 2121 | 1287 | 1665 |
| 1:3 | 1767 | 3488 | 2120 | 2458 |
| 3:1 | 1772 | 2723 | 511 | 1635 |

PM: Pearl millet; PP: Pigeonpea

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VARIABILITY AND CHARACTER ASSOCIATION OF METRIC TRAITS IN YELLOW GRAINED SORGHUM

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ABSTRACT

Variability and character association were studied for ten characters in 18 yellow grained genotypes of sorghum. The study indicated that selection programme keeping plant height at a desirable level and making selection for number of leaves and leaf breadth is ideal for improving both grain and straw yields in the yellow grained sorghum.

KEY WORDS: Yellow Grained Sorghum, Grain and Fodder Yield, Heritability, Correlation, Path Analysis

Yellow grained types of sorghum of *Periya Manjal Cholam* (*Sorghum bicolor* L. Moench) are tall growing, photosensitive and inherently low grain yielders. But, these are extensively grown in

certain pockets of Tamil Nadu, chiefly for their high fodder yield and drought resistant nature. The crop improvement programme would aim at improving the grain yield without any considerable