



## Performance of Finger millet (*Eleusine coracana* .L) Varieties under Different Crop Establishment Methods for North Coastal Andhra Pradesh

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### ABSTRACT

Field experiments were conducted for three consecutive *kharif* seasons of 2009, 2010 and 2011 at Agricultural Research Station, Seethampeta, Andhra Pradesh on sandy clay loam with an objective of identifying best method of crop establishment and promising varieties in Finger millet. Experiment consists of two main plots ( M1-direct sowing, M2- transplanting) and twelve Subplots (12 improved cultures viz., VR (W)–936, CTPL – 10, VR – 948, VR 762, VR – 943, VR – 929, VR – 900, PPR – 2885, PPR – 2886, VR – 952, VR – 958, and PR 1044 as control) laid out in a Split plot design with three replications. Direct sowing reduced the crop duration conspicuously. Higher number of productive tillers with lengthy panicles and more number of fingers, higher grain yield, better harvest index and more profits were recorded in transplanting compared to direct sowing. Among the improved cultures VR – 952 , VR-762 and PPR – 2886 proved effective irrespective of methods of crop establishment with superior yield attributes leading to with higher grain yield and returns.

**Key words :** Crop establishment, Finger millet, Improved cultures, Returns, Yield.

Finger millet (*Eleusine coracana* .L) popularly known as Ragi is still the important food crop of tribal farmers of Andhra Pradesh , where it is grown for both grain and fodder purpose. It still continues to be a staple food crop for tribals as well as working class and diabetic people in plains. There is increased awareness among the masses for ragi flour, which is one of the best suited cereals for preparation of weaning food due to presence of high quality protein, availability of various amino acids, rich in calcium, iron and phosphorus. Wide adaptation, easy cultivation, free from major pests and diseases, better tolerance to biotic stresses like drought and water logging have made this crop as indispensable for both rainfed and irrigated farming. Often in the lands where finger millet crop is raised , no other crop worth mentioning can give a reasonable harvest(AICSMIP,2002).However, the per acre yield of finger millet is low due to cultivation of locally adopted genotypes, negligible use of fertilizers and non-adoption of proper management practices (Rao *et al.*, 1989). In order to achieve the higher yields in Ragi, identification of superior varieties through field testing is one of the important approach.(Kamble *et al.*,2005).Raising finger millet both by direct sowing and transplanting, an attempt was made for

identification of suitable high yielding cultures for different methods of crop establishment.

### MATERIAL AND METHODS

Field experiments were conducted for three consecutive *kharif* seasons of 2009, 2010 and 2011 at Agricultural Research Station, Seethampeta, Andhra Pradesh, India. The soil was sandy clay loam having pH 6.8, organic carbon 0.66%, available nitrogen 257 kg ha<sup>-1</sup>, available P<sub>2</sub>O<sub>5</sub> 26.1 kg ha<sup>-1</sup> and K<sub>2</sub>O 302 kg ha<sup>-1</sup>. The treatments consisted of two main plots ( M1-direct sowing, M2- transplanting) and twelve subplots (12 improved cultures viz., VR (W)–936, CTPL – 10, VR – 948,VR 762, VR – 943, VR – 929, VR – 900, PPR – 2885, PPR – 2886, VR – 952, VR – 958, and PR 1044 as control). The experiment was laid out in a split plot design with three replications. The crop was sown and planted at a spacing of 22.5 cmX10 cm by dibbling and transplanting as per the treatments and uniformly, fertilized with 50-30-20 NPK Kg ha<sup>-1</sup>. All the treatments received uniform cultural and plant protection measures . The data on different growth parameters, yield attributes, yield and economics were recorded duly following the standard procedure from 10 randomly marked hills. Data

Table 1. Performance of Ragi (Finger millet) under different crop establishment methods and with improved cultures in terms of growth and yield attributes(Three years pooled data).

Crop establishment/ Variety	Days to 50% flowering	Days to maturity	Plant height (cm)	Panicle length (cm)	No. of fingers panicles	No. of productive tillers m <sup>-2</sup>	1000 grain wt (g)	Dry matter accumulation at harvest Kg ha <sup>-1</sup>
<b>Method of crop establishment</b>								
Direct sowing	86	107	116.2	7.35	5.96	86.1	2.81	4249
Transplanting	90	111	112.8	8.13	6.34	84.7	3.03	3936
SEm ±	1.58	1.62	2.04	0.53	0.48	1.60	0.31	307
CD at 0.05	NS	4.8	NS	1.56	1.42	4.7	NS	906
<b>Varieties</b>								
VR (W)– 936	91	112	106.5	7.53	5.27	64.0	3.05	3919
CTPL – 10	84	106	113.7	8.20	5.80	84.0	2.78	4300
VR – 948	87	107	103.7	7.80	5.00	60.3	2.63	3036
VR- 762	90	110	118.3	7.67	6.00	88.0	3.14	4988
VR – 943	85	105	113.1	6.27	6.07	78.3	2.97	2894
VR – 929	88	107	104.0	10.13	6.00	60.3	2.70	4356
VR – 900	91	112	109.7	7.60	5.73	72.0	2.82	4708
PPR – 2885	83	102	114.1	7.20	6.67	79.3	2.71	4350
PPR – 2886	89	110	106.1	9.47	6.73	71.7	2.85	4071
VR – 952	85	105	118.1	10.27	6.40	83.3	3.19	4769
VR – 958	90	110	111.7	6.67	6.27	83.3	3.07	4494
PR-1044	92	113	113.7	6.83	5.73	78.3	2.96	4572
SEm ±	3.19	4.52	4.63	0.63	0.29	4.83	0.47	248
CD at 0.05	NS	NS	NS	1.85	0.86	14.2	NS	719

were analyzed using ANOVA and the significance was tested by Fisher's least significant difference ( $p= 0.05$ ) by pooling three years data.

## RESULTS AND DISCUSSION

Perusal of the three years pooled data revealed that, growth parameters, yield attributing characters, yield and economic parameters like gross returns, net returns and rupee per rupee returned were conspicuously influenced by both crop establishment methods and different improved cultures (Table 1 & 2), However, the interaction effect of crop establishment methods and different improved cultures was non-significant.

### Crop establishment methods:

Days to 50% flowering was unaffected by crop establishment methods while the total crop duration was found to be significant. Direct sowing

reduced the crop duration conspicuously. There was no measurable difference in plant height between the two crop establishment methods. However at harvest was on par between the two accumulation crop establishment methods. All the yield attributing characters were significantly influenced by crop establishment methods. Higher number of productive tillers recorded in direct sowing were on par with transplanting while lengthy panicles and more number of fingers per panicle were recorded in transplanting compared to direct sowing. Similar findings of better growth and yield structure with transplanting over direct sowing of ragi was also reported by Nagaraju and Kumar(2009).

Grain yield was significantly higher in transplanting over direct sowing while straw yield was on a par between the crop establishment methods. Harvest Index also was numerically

Table 2. Performance of Ragi (Finger millet) under different crop establishments with improved cultures in terms of yield and returns (Three years pooled data).

Method of crop establishment/ Variety	Grain yield (kg/ha).	Straw yield (kg/ha).	Harvest Index (%)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	Rupee per rupee invested (Rs/Rs)
<b>Method of crop establishment</b>							
Direct sowing	1693	3711	31.33	16017	29955	13938	0.87
Transplanting	1986	3195	38.33	16952	32826	15874	0.94
SEm $\pm$	49.4	187	-	397	589	326	0.13
CD at 0.05	146	552	-				
<b>Varieties</b>							
VR (W)- 936	1807	3021	37.43	16502	29528	13026	0.79
CTPL - 10	1308	2784	31.96	15407	25207	9800	0.64
VR - 948	1619	2975	35.24	16595	27276	10681	0.64
VR- 762	2162	3609	37.46	15163	35513	20350	1.34
VR - 943	1417	2778	33.78	15233	27199	11966	0.79
VR - 929	1540	2855	35.04	15785	27676	11891	0.75
VR - 900	1388	2656	34.32	16281	25425	9144	0.56
PPR - 2885	1792	3357	34.80	16329	31199	14870	0.91
PPR - 2886	1970	3015	39.52	17195	33915	16720	0.97
VR - 952	2462	3756	39.59	16236	39117	22881	1.41
VR - 958	1644	3020	35.25	16851	19728	2877	0.17
PR-1044	1920	3113	38.15	15624	23040	7416	0.47
SEm $\pm$	61	305	-	417	728	309	0.14
CD at 0.05	179	901	-	1230	2147	911	0.41

higher in transplanting. Higher grain yield in transplanting might be due to higher early growth in nursery upto 24 days and also due to better root growth and root pruning in transplanted crop manifested with superior yield structure and grain yield. These findings are in conformity with the earlier findings of Gowda *et al.*, (1993). Though there was no statistically measurable difference in cost of cultivation between the two crop establishment methods, gross returns and net returns were conspicuously higher with transplanting. Rupee returned per rupee invested also was better with transplanting method of crop establishment over direct sowing.

#### Improved varieties:

Difference in the phenophasic parameters like days to 50% flowering and days to maturity were not measurable statistically among different cultures. There was no marked difference in plant

height among different cultures. Among different cultivars, the highest dry matter production was noticed in VR-762, which was significantly superior over cultivars VR (W)- 936, VR - 948, VR - 943 and PPR - 2886, while the lowest was recorded with VR - 948. Yield contributing character. Panicle length was maximum in VR - 952 followed by VR - 929 and PPR - 2886, whereas, it was lowest in VR - 958 and PR 1044. The number of finger per panicle was significantly higher in PPR - 2886 and PPR - 2885 and was lowest in VR - 948 and VR (W)- 936. The most important yield contributing character number of productive tillers m<sup>2</sup> was measurably higher in VR-762 and CTPL - 10, whereas it was its minimum in VR - 929, VR - 948 and VR (W)- 936. 1000 grain weight was statistically was not significant among all the test cultures.

The grain yield was significantly higher in VR - 952 over all other test cultures and it was

followed by VR-762 and PPR – 2886. Higher yields in VR 952 might be due to higher panicle length coupled with higher 1000 grain weight with reasonably more number of productive tillers. The straw yield was highest in VR – 958, which was significantly superior over all other test cultures except VR – 900, CTPL – 10 and VR – 952. The harvest index also was higher in VR – 952, PPR – 2886 and VR-762 and it was minimum in PR-1044 and CTPL – 10. Economic analysis of the data reveals that, the cost of cultivation was minimum in VR-762 and maximum in PPR – 2886. Gross returns and net returns and rupee returned per rupee invested were higher in VR – 952 followed by VR-762 and were lowest in VR – 958.

It can be inferred that, transplanting method of crop establishment proved effective over direct sowing in ragi with better growth and yield resulting in higher profits. Among the improved cultures VR

– 952, VR-762 and PPR – 2886 proved effective irrespective of methods of crop establishment in terms of yield and profits.

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