

Correlation studies in mesta genotypes with respect to biophysical, biochemical and yield parameters contributing to fibre yield

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Eleven genotypes of mesta were evaluated for correlation studies of biophysical, biochemical and yield parameters with fibre yield during *Kharif* 2002, at Main Agricultural Research Station, Dharwad. Significant correlation of above parameters was found with fibre yields. Fibre yield had significantly positive correlation with stomatal frequency on abaxial and adaxial surface, RWC, LIR, chlorophyll (a, b and total), plant height, stalk yield and fibre equivalent yield at harvest. Basal stem diameter, days to 50 per cent flowering, fibre recovery and seed oil per cent had positive and non-significant association with fibre yield. Whereas, phenols, tannins, sugars and seed yield had significantly and negative correlation with fibre yield. It could be concluded that stomatal frequency, RWC, LIR, leaf chlorophyll content may be considered as selection parameters for higher fibre yield in mesta genotypes.

Key words : Mesta, Genotypes, Biochemical, Fibre, Correlation

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INTRODUCTION

Mesta (*Hibiscus* spp.) is one of the important fibre crops and stand next to jute in production. Mesta cultivation is widely scattered in eastern, northeastern and southeastern states of India. It is the nearest alley of jute and plays an effective role in supplementing the short supply of raw material in jute industry. It is also used as raw material in the paper industry as a substitute to bamboo and eucalyptus (Sheshadri *et al.*, 1987). Though, this crop is well suited and adopted to northeastern parts of the country, it is capable of growing luxuriantly even under adverse and wide range of soil and climatic conditions (Sinha and Shaha, 1980). Hence, there is a scope to extent its cultivation in the non-traditional areas. To findout the dependable parameter for yield improvement among the larger variable parameters correlation study helps to findout the direct and indirect causes of association (Wright, 1921). Therefore, a study was conducted to findout the association of different parameters with fibre yields in mesta genotypes.

RESEARCH METHODOLOGY

Field experiment was conducted at Main Agricultural Research Station, University of Agricultural

Sciences, Dharwad during *Kharif* 2002 under rainfed condition. Soil was medium deep black with pH 7.1 and EC 0.21 dS m⁻¹. The experiment was laid out in a randomized block design with eleven mesta genotypes (AMV-1, AMV-2, AMV-3, AMV-4, AS-73 CP-560, HS-1, HS-2, HS-4288, HS-7910, HC-583 and AMC-108) replicated thrice. The seeds were sown in the spacing 30 10 cm and fertilizer was applied 40:20:20 kg NPK per ha. Routine cultural operations were attended to keep the plot free from weeds. The observations on biophysical and biochemical were recorded at 40, 80, 120 DAS and at harvest by using standard procedure. The yield and yield parameters were recorded at harvest, statistically analysed and correlation coefficients with fibre yield were estimated.

RESULTS AND ANALYSIS

The data on correlation coefficients of different biophysical, biochemical and yield parameters recorded at different stages of growth with fibre yield as presented in Table 1. Among the biophysical parameters, significantly positive correlation was observed for stomatal frequency on either of the leaf surface, relative water content and light interception ratio recorded at all stages of growth

Table 1: Correlation studies of biophysical, biochemical and yield parameters with fibre yield in mesta

Parameters	40 DAS	80 DAS	120 DAS	At harvest
A. Biophysical parameters				
Stomatal frequency on abaxial surface	0.698**	0.668**	0.679**	0.694**
Stomatal frequency on adaxial surface	0.780**	0.761**	0.819**	0.877**
Relative water content	0.560**	0.723**	0.703**	0.710**
Light interception ratio	-0.116	0.380**	0.667**	0.415**
B Biochemical parameters				
Chlorophyll – a	-0.326	0.654**	0.807**	0.647**
Chlorophyll – b	-0.416	0.836**	0.711**	0.667**
Total chlorophyll	-0.467**	0.792**	0.825**	0.656**
Phenol	-0.446	0.817**	0.880**	-0.557**
Tannin	-0.312	0.804**	0.871**	-0.446**
Reducing sugar	0.386**	0.707**	0.812**	-0.517**
Non-reducing sugar	0.285	0.328	0.278	-0.769**
Total sugar	0.573**	0.813**	0.808**	-0.408**
C. Yield parameters				
Days to 50% flowering	-	-	-	0.098
Plant height	-	-	-	0.683**
Basal stem diameter	-	-	-	0.042
Basal stem diameter	-	-	-	0.042
Stalk yield	-	-	-	0.472**
Fibre recovery	-	-	-	0.037
Seed yield	-	-	-	-0.747**
Fibre equivalent yield	-	-	-	0.739**
Seed oil (%)	-	-	-	0.274

* and ** indicates of Significance of values at p=0.05 and 0.01 respectively

except, a negative and non-significant correlation of LIR at 40 DAS. The absence of correlation of LIR at 40 DAS may be attributed to the smaller leaf area for light interception compared to that of later bearing on fibre yield as they have direct correlation with the photosynthesis and dry matter production. Among the biochemical parameters, the chlorophyll content measured at 80, 120 DAS and at harvest also showed significant and positive correlation with fibre yield. This is quite natural as chlorophyll is the primary pigment associated with photosynthesis. However, phenols, tannins and sugars had significantly positive association with fibre yield at 80 and 120 DAS, but negatively significant association with fibre yields at harvest. The positive association of these biochemical constituents at active growth phase (80 to 120 DAS), may be attributed to the increased metabolism of these biochemical constituents with the increased rate of accumulation compared to the rate of

translocation to sink. On the contrary, at harvest, these constituents had significantly and negative correlation coefficients indicating the reduced metabolite rate.

Among fibre yield contributing parameters, significant and positive correlation was observed for plant height ($r = 0.683$) and stalk yield ($r = 0.472$). Similar results were reported by Aruna (1988). The seed yield had significantly negative correlation. The seed oil content ($r = 0.274$), days to 50 per cent flowering ($r = 0.098$) and basal stem diameter ($r = 0.042$) had positive but non-significant association with fibre yield. The fibre being the part of stem dry matter and seed being the part of reproductive part dry matter will have compansiantly mechanism for dry matter partitioning. Based on the present study, it could be concluded that stomatal frequency, RWC, LIR, leaf chlorophyll content may be considered as selection parameters for higher fibre yield in mesta genotypes.

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