The study on genetic analysis of some growth parameters in jute (Corchorus olitorius L.) was undertaken with a view to elucidating genetic control of some physiological components such as dry matter, RGR, NAR, LAI, HI, leaf angle and fibre yield in two sets of diallel crosses combining the methods of growth analysis and biometrical analysis related to quantitative genetics. One set consisted of eight high yielding cultivars and their \( F_1 \)'s without reciprocals and the other consisted of six wild types of C. olitorius and their \( F_1 \)'s without reciprocals. Parents and crosses of 8 x 8 and 6 x 6 diallel sets were sown in four replications in randomize block design in separate layouts for two consecutive years, 1979 and 1980.

The total dry matter \((\log_e W)\) at different stages of harvests (at 4th, 8th, 12th and 16th week of crop age) was fitted to quadratic curve using orthogonal polynomial and the slopes (i.e. linear regression coefficients, \( b' \)) and the curvatures (\( c' \)) were obtained for each parent and cross over stages, years and replications. Linear part accounted for maximum or the total variability due to stages of growth. The slopes (\( b' \)) for all the parents and the crosses in both of sets of diallel crosses were significantly different and curvatures (\( c' \)) of the parents and the crosses in both the sets were not significant.

Analysis of variances of the diallel tables of the mean values of slopes (\( b' \)), Relative Growth Rate (RGR), Net
Assimilation Rate (NAR), Leaf Area Index (LAI), Harvest Index (HI), Leaf Angle and Fibre Yield of the parents and the crosses of 8 x 8 and 6 x 6 diallel sets were computed following the method of Jones (1965) to partition the variances of the genotypes (homozygotes and heterozygotes) assignable to additive ($a$) and dominance ($b$) and its subcomponents, $b_1$ indicating variance for midparental deviation of hybrids, $b_2$, indicating dominance variance due to asymmetry of dominant gene distribution in the parents, and $b_3$ indicating residual dominance. The variances of the interactions of first order (genetic x year and genetic x stages) and second order (genetic x year x stages) as appropriate for individual analysis of variance were computed. Total correlations among the different physiological components were computed.

Additive ($a$) and dominance ($b$) variances for slopes ($b'$) in 8 x 8 diallel set were of equal order. Additive variances for slope in 6 x 6 diallel set was three times larger than dominance variance. Average heterosis ($b_1$) in both sets was not significant. Additive component of both the diallel sets did not interact with year. Dominance component interacted with year significantly. Additive component was found significant against residual error and second order interaction in both the sets. Dominance was significant against residual error in both sets but was not significant against second order interaction in 6 x 6
diallel set.

RGR's of the parents and the crosses were significant only at 4th week of both the sets of diallel and were not significant at 8th, 12th and 16th week. Additive and dominance variances for RGR at 4th week of both the sets of diallel were of equal order. Average heterosis ($b_1$) in 6 x 6 diallel set was significant but not so in 8 x 8 diallel set. Additive component did not interact with year in both the sets and dominance component did not interact in 8 x 8 diallel, but interacted significantly with year in 6 x 6 diallel set. Both additive and dominance variances were significant against residual error, but when tested against their first order interactions, only dominance variance was found significant in 8 x 8 diallel set.

Additive and dominance variances for NAR were significant both against residual error and genetic x year x stage interactions in two sets of diallel. Additive variance in 8 x 8 diallel was greater than dominance and was smaller than dominance variance in 6 x 6 diallel set. Average heterosis ($b_1$) in both the sets were significant. Additive and dominance variation did not interact with year but interacted significantly with stages. Additive x year x stage interactions and dominance x year x stage interactions were significant in both the diallel sets.

Dominance variance was much larger than additive variance for LAI in both the sets of diallel. Average
heterosis ($h_1$) in both the sets of diallel was the major component of dominance. Additive component did not interact with year in both the sets of diallel but interacted significantly with stages. Dominance interacted significantly with year and stages. Second order interactions were not significant. Additive and dominance variances were significant against residual error as well as against their second order interactions.

Additive variance for HI in both the diallel sets was significant. Dominance variance in 6 x 6 diallel set was significant but not in 8 x 8 diallel set. Additive variances in 8 x 8 and in 6 x 6 were 27.7 and 17.5 times larger respectively than their dominance variances. Additive component in both the sets was also significant against their second order interactions and dominance variance was not significant against their second order interaction in both the sets of diallel. No average heterosis was found in either of the sets. Additive and dominance variances in both the sets of diallel interacted significantly with year. Additive and dominance did not interact significantly with stage in 8 x 8 diallel set. But additive component interacted significantly with stage in 6 x 6 diallel set and dominance in this set did not interact with stage. Additive x year x stage and dominance x year x stage in 8 x 8 diallel set were significant but these interactions were not significant in 6 x 6 diallel set.
Additive and dominance variances for leaf angle in 8 x 8 diallel set were significant. Additive variance was 28 times larger than dominance variance. Additive, not the dominance variance, was significant against their interaction with year. Both additive and dominance components interacted significantly with year.

Additive and dominances for fibre yield in both the sets of diallel were significant. Additive and dominance variances were also significant against their respective interactions with year in 8 x 8 diallel set. Against the first order interactions, only dominance variance was found significant. Average heterosis ($b_1$) was the major component of dominance in both the sets of diallel. While additive and dominance components interacted significantly with year in 6 x 6 diallel set, they did not interact with year in 8 x 8 diallel set.

Total correlations between RGR and NAR in 8 x 8 diallel at all the stages and year was significant in positive manner. Correlations between RGR and NAR in 6 x 6 diallel at different stages of two years, except at 4th week of first year and 4th and 8th week of second year, were significantly positive. The correlations between NAR and LAR at all the stages of two years in both the sets of diallel were negatively significant. LAR was found significantly correlated with LAI in positive direction in all the stages of years in both the diallel sets. LAI was significantly
correlated in positive manner with total dry matter in both the sets at all the stages of growth in two years. LAI was also found positively correlated with weight of fibre from dry ribbon in both sets of diallel at three stages in both years. The multiple correlations among RGR, NAR and LAR were significant in both the sets of diallel at all the stages of growth of two years.

Genetic prepotency of parents used in two diallel sets was determined from the mean general combining ability. The parent, Tanganyika-1 of 8 x 8 diallel set exhibited highest gca effects for HI and fibre yield and the parent Bangkok-1 exhibited highest gca effects for leaf area index and leaf angle in 8 x 8 diallel set. The parents Russian-1, Russian green and 050-4963 exhibited highest gca effects for NAR, total dry matter (log\(e^W\)) and slope (\(b'\)) respectively. The parent, IC-15901 of 6 x 6 diallel showed highest gca effects for total dry matter (log\(e^W\)), NAR, slope (\(b'\)) and fibre yield and the parent Green early exhibited highest gca effects for HI and LAI.

The genetic importance of these growth parameters have been discussed.