Summary

The vegetative and reproductive growth of the American Upland cotton in the black cotton soils of Malwa under rainfed conditions are studied in eighteen complex experiments and the effects of sowing time, spacing, nitrogen, phosphorus and potash on the various characters are determined separately and in combination with one another.

2. The cotton plant in this tract produces extension growth for the first 100 days after sowing but there is not much increase in dry matter due to unfavourable weather conditions during the monsoon months. The increase in dry matter occurred with the cessation of monsoon and the return of bright weather.

3. Early sowing by well irrigation i.e., three weeks before the rains set in and manuring with nitrogen produced similar effects. Both the factors increased significantly the height, the dry weight, boll number, boll weight and yield, while spacing produced very small effect on these characters. Closer spacing produced more bolls and yield per unit area than wider spacing. Phosphorus had slightly increasing effect on vegetative and fruiting characters and potash had no effect.

4. The relative growth rate and the net assimilation rate are higher in the early stages of growth in the pre-rain sown
crop than in the case of rain sown crop as the farmer are exposed in the early stages to favourable weather conditions such as bright sunshine, high temperature and favourable moisture conditions. The effect of nitrogen on growth was high during the first thirty days and during the later stages of growth nitrogen treated plants showed lower rate than untreated plants.

5. Early sowing and application of nitrogen had slightly lowering effect on first fruiting node and induced earliness in crop maturation.

6. The effect of sowing date on fruiting coefficient i.e., the capacity for producing seed cotton per unit dry matter, was interrelated with soil and climatic conditions while nitrogen and wider spacing had increasing effect on fruiting coefficient.

7. Early sowing, manuring with nitrogen and close spacing proved to be the best combination for vegetative and the reproductive growth. Highest yields were registered under this combination. This finding held good for both the soil types viz., well drained and waterlogged.

8. Application of nitrogen brought about an earlier maturity of the crop by nearly a fortnight. The flowers appeared ten days earlier. The rates of flowering and bolling were also found to be much higher in the early stages of the reproductive phase in the manured plants than in the control.
The arrival of the crop was thus early by 10% in the manured plots.

9. Some interesting differences in the physiology of growth of *hirsutum* cottons grown under Punjab conditions and under Malwa conditions have been brought out by this investigation.

10. It is demonstrated that the red leaf disease in American Upland cottons may appear on account of the operation of the different factors in the different cotton tracts. The combination of factors that produce the red leaf blight in American Upland cottons under Malwa conditions has been visualised. The leaves become senescent at the fruiting stage and low temperatures that prevail from October onwards appear to favour the production of red pigments in those cells which may contain the basic material for their formation. If senescence can be delayed at the time of maturity by debudding the plants from the time of their appearance, the appearance of the red leaf can be almost prevented instead of lower temperatures.

11. As the soils are alkaline in reaction the application of small amounts of copper, boron, manganese, zinc and chromium have been found to increase the yield of cotton by nearly 10 to 25 percent of the normal. It appears that the effect of one application may last for three or more seasons. In that case the use of copper or boron may prove economical and practical.