CHAPTER-I
INTRODUCTION

Soybean (Glycine max (L.) Merrill), a native of eastern Asia, is one of the oldest crops known to mankind and was extensively grown long before the written history began. First record in Chinese book dates back to 2838 BC. It was introduced in France in 1740, in England in 1790, and in USA in 1804, but gained commercial importance by the end of 19th century only. The U.S. Department of Agriculture identified 23 varieties then known in America, and to this 629 varieties were added till 1920. Out of these, 100 varieties were selected and widely grown throughout the United States of America. The centre of origin of soybean is China and from where it was introduced in Northern India, Java and Burma (Sonakia, 1969).

Soybean was first introduced in the Himalayan ranges of North India. A small black seeded variety was in cultivation in 1882 at Nagpur Farm (Mehta, 1986). Most of the varieties available during the past are still being grown in the hilly regions of Uttar Pradesh and parts of Madhya Pradesh. These varieties are late maturing. The 'Kala Bhat' of Kumaon and 'Kalitur' of Madhya Pradesh were grown since long (Singh and Saxena, 1975; Mehta and Beohar, 1985). The first scientific study that made the soybeans known to Europeans was published in 1712 by Engelbert-Kamfar (Bombay Presidency Baby and Health Week Association, 1935; Gandhi, 1935).
Available information revealed that Government of Madhya Bharat published the first pamphlet on soybean research in 1935 (Appendix I-A, B). The research work could not be taken up further due to non-availability of suitable varieties.

New era of soybean research was begun in India during 1964-65 as there was growing demand of protein and edible oil, for which soybean was considered to be potential source. Evaluation of exotic genotypes from USA and indigenous varieties was carried out jointly by Agricultural Universities at Jabalpur in Madhya Pradesh and Pantnagar in Uttar Pradesh. To overcome various breeding problems on soybean, 1600 to 4000 lines collected from all over the world were screened and selected for specific characters, to be tested for hybridization programme or for direct use as variety. Within the period of two decades of varietal improvement work, the different coordinating centres of India had developed some high yielding and adaptable varieties for cultivation in different agro-climatic zones of India. Varietal improvement work at Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, brought out suitable varieties for Madhya Pradesh, which has resulted in tremendous increase in the soybean area and production. This state had an area of 4,000 hectares under soybean with 2,000 tonnes of production in 1964, which increased to 1,755 thousand hectares in 1989 (Appendix II), which enabled Madhya Pradesh to earn the title 'Soya State'.

The world production of soybean increased seven fold from about 13 million tonnes in 1939 to about 94 million tonnes in 1979. The productivity of soybean in this sub-continent is still low. Even high yielding varieties have 807 kg/ha production in India as against the world average of 1,601 kg/ha.

Yield is the physical description of the end product of physiological process for economically useful purposes to human beings on unit area basis. In terms of yield, assimilates partitioning is important in both the vegetative and reproductive growth phases. Partitioning during the vegetative phase determines the final leaf area, root development and branching. Investment of assimilates into plant growth during the vegetative period determines the productivity at later stages of development. Partitioning during reproductive phase is important for flowers, fruits and seeds. Assimilates are distributed from current leaf photosynthesis, non-laminar photosynthesis and remobilization of stored assimilates. The proportion of assimilates derives from each source on genotype and environment. Although many climatic factors influence the plant growth and development, temperature is one of the primary factors affecting growth. Any physiological and morphological development occurring in plants are influenced by temperature. The heat unit concept is based on the idea that plants have a temperature requirement for their growth and development. The heat unit system
has now been widely used as a guideline to select a desirable genotype for a particular location to have maximum yield potential realization.

The crop should quickly produce enough leaf area index to intercept most of the light for maximum dry matter production, after which it should maintain high light interception and should partition assimilates in the largest quantities possible to the organs of economic value, without affecting quality or harvestability for higher yields.

Keeping the above facts in view, the present investigation was carried out with the following objectives:

(1) To ascertain the morphological attributes contributing to earliness as early maturing varieties are needed in the area under study because of rainfed cultivation.

(2) To assess physiological traits responsible for higher seed yield.

(3) To study the relationship between vegetative and reproductive phases.

(4) To correlate quantitative traits with climate for higher yields.

(5) To evaluate the cultivars for their suitability under agro-climatic conditions of Sagar district.
(6) To develop a variety best suited to agro-climatic conditions of Sagar district on the basis of morphological, physiological and quantitative attributes.