CHAPTER I

Introduction

Vegetables occupy a very significant place in the realm of Indian agriculture. They are considered as essential food, rich in various nutrient elements. Different vegetables are good sources of proteins, carbohydrates, minerals, vitamins etc. Hence, they are reckoned as protective food essential for human health. Apart from being a subsistence crop, vegetables are potential source of improving economic status of farmers in general and small and marginal farmers, in particular.

Cultivated cabbage was derived from the wild cliff cabbage known as Coleworts. Cabbage was found in the wild state on the chalk rocks of the Sea Coast of England, on the coasts of Denmark and north-western France and in various other localities from Greece to Britain. The word cabbage was derived from French word "Coboche" meaning "head". It has been known from the earliest time and was probably in general use in 2,000 and 2,500 B.C. It was held in high esteem by the ancient Greeks and is said to have been worshipped by Egyptians.
Cabbage belongs to the family Cruciferae; genus Brassica; sp; oleracea, bot, var Capitata according to Linnaeus. It was introduced in America in 1540 and in India, in the last few decades from Europe. It is grown all over the country and is one of the important and popular vegetable crops during winter season in the plains of U.P. Apart from high tonnage Cabbage is a rich source of minerals, vitamins and roughages. Cabbage can withstand rough handling as well as long distance transport and thus fetch better return.

The optimum production of cabbage is largely dependant on total dry matter production which predominately represents the yield. The total dry matter depends upon two physiological factors viz., Photosynthetic surface and (ii) Photosynthetic efficiency.

One of the basic factors for optimum crop production is the supply of plant nutrients in adequate amounts and balanced proportions. It is quite difficult to maintain the desired levels of soil fertility without balanced fertilization. The understanding of the process of release and fixation of nutrients by soil minerals, change associated with absorption of nutrients by plants and their metabolism in plant tissues are becoming gradually clearer. With the latest scientific techniques used in research, it would be possible to assess optimum nutrient requirement of crops in relation to moisture and energy levels under various situations.

The modernisation of agriculture is going hand in hand with the increased use of agro-chemicals. The use of chemicals in
Agriculture started with the use of fertilizers followed by plant protection chemicals or pesticides. The latest to join the group is plant growth substances.

The discovery of plant growth substances has been considered as a revolution in the history of agriculture as it has brought amazing vast new possibilities of delicate and wonderful adjustment of development pattern in plants. Growth substances enabled man to control the plant growth and has become the greatest tool in the hands of horticulturists for increasing yield and better quality of vegetables.

Among the growth substances gibberellins have excited much horticultural interest by virtue of its diverse effects. This is a hormone of diverse and powerful regulatory functions.

Importance of gibberellic acid in increasing the photosynthetic surface has long been recognised and considerable amount of research work has been carried out on this aspect (Marth et al., 1956; Randhawa and Pal, 1968; Jauhari et al., 1960, Chauhan and Singh, 1970, Islam, 1985 and Patil et al., 1987).

According to Lona (1956) and Hayashe Murakami (1958), GA perhaps increased the leaf area by its effect on cell division and cell enlargement. There may be increase in leaf number due to GA application. This may be another possible explanation for an increase in photosynthetic surface due to GA treatments.

There are also number of experimental evidences which suggests that gibberellic acid leads to an increase in photosynthetic efficiency. Alvim (1960) found that both the net assimilation
and relative growth rate of kidney beans grown in solution culture were increased by spraying the plants with gibberellic acid.

Forgetting maximum response of gibberellic acid other principle factors controlling the plant growth must be present in optimum level one of the principal factors controlling the rate of leaf production (leaf area) is the supply of nutrients, in general and nitrogen in particular. Nitrogen is the most important element and occupies the first place. It helps in root initiation and development, better vegetative frame work, blossom, bud differentiation, flower and fruit setting, size and weight of the edible material and ultimately yield. It also improves the colour, texture and structure of edible material thereby the quality of the produce.

Optimum plant population per unit area facilitates for maximum interception of sun-shine for more dry matter production. Since the stature of plant is changed by GA, it appears probable that spacing of GA treated plants will also differ from those of control plants.

These conditions, thus make it necessary to investigate in to the effect of GA in relation to nitrogen and plant population for getting maximum head yield of cabbage variety Pride of India under agro-climatic condition of Allahabad region.

Keeping these unresolved aspects in view, the present investigation entitled "Effect of gibberellic acid, nitrogen levels and spacings on growth, yield and quality of Cabbage (Brassica oleracea var. Capitata Linn.)" was planned and conducted at the
Kulbhaskar Ashram Post-Graduate College, Allahabad during the two consecutive Rabi seasons of 1987 and 1988 with the following broad objectives:

1. To find out the optimum dose of nitrogen for increasing cabbage yield,

2. to determine the optimum concentration of GA for cabbage cultivation,

3. to find out the optimum spacing for cabbage planting,

4. to find out the optimum combination of nitrogen, gibberellic acid and spacing for getting maximum yield of cabbage, and

5. to work out an economics of different treatments in terms of benefit:cost ratio.