

CHAPTER 1

INTRODUCTION

Soybean (*Glycine max (L) Merr*) is a world economic crop and the most important cultivated legume. There are many soybean varieties but only a few of them are commercially grown as vegetable soybeans. Vegetable soybean is the soybean with big green pods and harvested during R6 and R7 growth stages (Shanmugasundaram, 1989). The bean seeds are large, soft and considered as the most delicious and nutritious green vegetable in Japan, Korea, China, Thailand and Nepal.

Compared with other vegetables, vegetable soybean is rich in protein, fat, phosphorous, calcium, iron, vitamin B1 and B2 (Shanmugasundaram, 1989). It also has the highest net protein utilization value among all other soybean products (Singleton *et al.*, 1983).

Although soybean can fix large amount of N, the total N requirement for soybean may not be met simply through the nitrogen fixation by the nodules, especially when one is expecting high yield (Kawahara *et al.*, 1986). There are two stages, which are reported to respond more to

N fertilizer application. Usually nodules are formed by 15-20 days after sowing and commence to fix N at the 20-30 days after sowing (Tanner and Hume, 1978). Thus, in low nitrogen soils, a basal nitrogen application is necessary to increase photosynthesis and growth at the seedling stage. Nitrogen supply of soybean during the pod filling stage is crucial for maximizing soybean yield since early N application is not enough to maximize the soybean yield. The best way to solve this problem is to apply supplemental nitrogen at flowering. Adding supplemental N at flowering can increase the carbon accumulation by augmenting photosynthesis and it may also increase the nitrogen accumulation to meet the nitrogen requirement for seed development (Watanabe *et al.*, 1983).

Allos and Bartholomew (1959), concluded that with the many species studied, "only about one-half to three-fourths of the total nitrogen" for maximum yields could be supplied by the N fixation process. However, nodulation and symbiotic N fixation are very sensitive to the N level present in the soil condition. High rates of N application will depress N fixation from the air.