

CHAPTER 1

INTRODUCTION

Azuki bean (*Vigna angularis* [Willd.] Ohwi and Ohashi) belongs to the family *Fabaceae*, tribe *Phaseoleae*, subtribe *Phaseoliinae*, genus *Vigna*, subgenus *Ceratopteris* (Piper) Verdc. This crop is a kind of legumes which has been widely consumed in Asian countries, especially in Japan where about 120,000 tons per year of azuki bean grain are used annually as foods. Production of azuki bean in Japan is not sufficient for domestic consumption. Hence, bean grain is imported to Japan from various places of production such as China, Australia and the United State of America (McClary, 1990; Chikamori, 1997).

Tiyawalee (1978) was first to report on growing of azuki bean on highland in the northern part of Thailand. There were three varieties of azuki bean, i.e., Akatsukidainagon, KS120 and Chien Shien which were tested and it was found that these varieties adapted well and gave satisfactory yield of 178, 155 and 157 kg per rai, respectively. Recently, The Royal Project Foundation introduced one famous azuki bean variety named “Erimo” from Japan for farmers to grow as a cash crop on the highland areas in the northern part of Thailand. It has been reported that this promising azuki bean variety is able to grow commercially on highland growing areas where climatic conditions during the growing season is similar to its place of origin, but variations of grain yields which ranged from low to highly-acceptable levels were always obtained. This unstable yield performance might probably be due to its narrow genetic base that resulted in expressing adaptive traits of growth and development within a specific range of highland environments. These observations were supported by yield trial results which were reported by Julsrigival *et al.* (2004) and yield stability evaluation by Kunkaew *et al.* (2004). Azuki bean breeding work in Thailand is still quite limited. Julsrigival *et al.* (2007) reported on improvement of azuki bean variety and obtained one promising variety named “Pangda”. This newly-developed

variety gave high potential yield ability, good seed quality for bean paste production and could grow and adapt well to highland planting areas in the northern part of Thailand. In order to develop a wider genetic base and create better adaptability of azuki bean varieties for growing on the highland areas in Thailand, yield and yield components of azuki bean are considered as quantitative traits and controlled largely by partial polygenes to multiple genes (Han *et al.*, 1984). In addition, genotypic variation of traits will mainly occur due to interaction of genotype and environment. Since quantitative genetic study of this crop especially under highland condition is still quite scarce, analysis of quantitative genetic in this study will serve as a guide line for azuki bean varietal improvement program in the future.

Objectives

This study is aimed to obtain the genetical informations of grain yield and yield components (seed size, plant height, number of branches per plant and so on) in azuki bean by analysis of genetic control, such as, number of gene pair control, combining ability, generation mean analysis, heterosis, generation variance analysis, heritability and genetic gains.