CHAPTER 6

GENERAL CONCLUSIONS

This study was carried out by planting six generations of azuki bean crosses which included P1, P2, F1, F2, BC1 and BC2 generations. Four parents of azuki bean were crossed in all possible combinations without reciprocals for developing off-spring generations, involving Kamuidainagon (K), Hondawase (H), Akatsukidainagon (A) and Erimo (E). The experiments were conducted on the three highland areas which are different in altitudes, namely, Inthanon Royal Project Research Station (1,300 m above sea level, ASL), Khunpae Royal Project Development Center (1,200 m ASL) and Pangda Royal Agricultural Station (700 m ASL). Parental lines and their off-spring generations were grown for two consecutive growing seasons during August to December in 2005 and 2006 in a field in a randomized block design with four replicates. Genetic control for yield and yield components in crop were studied as the following topics: (1) number of gene control, (2) combining ability, (3) generation mean analysis, (4) heterosis, (5) generation variance analysis, (6) heritability and (7) genetic gains and response to selection. General conclusions could be made as follow:

1. Seed yield and yield components of azuki bean were quantitatively gene-controlled. Amount of gene pairs for controlling were different among the individual trait. The number of gene pair was influenced largely by environmental conditions.

2. Combining ability estimate revealed the magnitudes of both g.c.a. and s.c.a. for parents and hybrid crosses. Seed yield and yield components of azuki bean were controlled by additive gene effect and non-additive gene effect. For seed yield per plant and number of pods per plant, non-additive gene effect was more important than additive gene effect. Interaction between s.c.a. x L was found, indicating that non-additive gene effect responded greatly to environmental changes.

3. Generation mean analysis confirmed the combining ability estimate that non-additive gene effect played more significant role in controlling seed yield per plant and number of pods per plant. All of genetic effects (additive, dominance and epistasis) were also influenced by environmental factors.

4. Low heterotic effects were observed for seed yield per plant and other yield components since environmental variance of individual trait was high. As well, heterotic effects varied slightly to largely from location to location and year to year for individual trait.

5. Generation variance analysis also indicated that variance was due to additive (V_A), dominance (V_D) and environmental (V_E) variances which were different from location to location and year to year. V_A, V_D and V_E of seed yield per plant were rather high when compared with its yield components.

6. For heritability estimate, both yield and yield components were rather low and varied slightly to largely from location to location and year to year since large value of environmental variance of each trait was accounted for genetic effect in inheriting of individual trait.

7. Genetic gains and response to selection revealed that genetic gains for seed yield per plant and yield components were low to medium-high, ranging from 8.5 to 43.9 percent in 2005 and 13.3 to 38.4 percent in 2006. For response to selection, it indicated that expected and observed mean of seed yield per plant were significantly different but 100-seed weight was not.

In conclusion, this study provides useful genetical informations on seed yield and yield components of azuki bean by estimating and analyzing various genetic controls under different highland conditions which will serve as a guide line for varietal improvement programme of azuki bean crop in the future.