

Utumporn Sompong 2011: Mapping of Quantitative Trait Loci Conferring Phosphorus Compound Contents in Seed and Seedling of Mungbean (*Vigna radiata* (L.) Wilczek). Doctor of Philosophy (Plant Breeding), Major Field: Plant Breeding, Interdisciplinary Graduate Program. Thesis Advisor: Professor Peerasak Srinives, Ph.D. 90 pages.

Phytic acid (PA) is the principal storage form of phosphorus in seed of cereals and legumes. It is a powerful inhibitor against the absorption of proteins and certain mineral nutrients. Mungbean is an important Asian legume which has only little research on PA. The objectives of this study were to (1) identify mungbean germplasm with low and high seed PA, (2) estimate narrow-sense heritability (h_n^2) of phosphorus (P) compound contents in seed, (3) investigate changes of P compound contents during germination, and (4) identify QTLs for the contents in seed and seedling. P compound contents were determined by colorimetric methods. Eleven accessions each of cultivated and wild mungbean were assessed for PA content. V1137BG, V1725BG, AusTRCF321936, and Sukhothai had highest PA content of about 16 mg.g⁻¹, while AusTRCF321925 had the lowest content of 8.68 mg.g⁻¹. Two high PA accessions, V1725BG and Sukhothai were crossed with two low PA accessions, AusTRCF321925 and AusTRCF322012 resulting in four population for estimating h_n^2 of the P contents. The h_n^2 estimates of phytic acid P (PAP) content in seeds of the four populations ranged from 0.12 to 0.88, those of inorganic P (IP) content ranged from 0.30 to 0.61, and those of total P (TP) content varied from 0.06 to 0.69. All accessions showed a dramatic increase in IP content following seedling ages at 12, 24, 48 and 72 hr., however they showed decreased PAP content and stable TP content. QTL analysis was conducted using F_{2,3} population of 170 lines derived from a cross between V1725BG and AusTRCF321925. A linkage map consisting of 101 SSR markers on 13 linkage groups was developed. Four QTLs were identified conferring the content of IP in seed, three for PAP in seedling, two for PAP in seed and TP in seedling, one for TP in seed and IP in seedling, and ten QTLs were identified for three agronomic traits.

Student's signature

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