

Alisa Kongjaimun 2012: The Genetics of Domestication-related Traits of Yardlong Bean [*Vigna unguiculata* (L.) Walp. ssp. *unguiculata* cv.-gr. *sesquipedalis*]. Doctor of Philosophy (Plant Breeding), Major Field: Plant Breeding, Faculty of Agriculture at Kamphaeng Saen. Thesis Advisor: Professor Peerasak Srinives, Ph.D. 115 pages.

The genetics of domestication-related traits of yardlong bean [*Vigna unguiculata* (L.) Walp. ssp. *unguiculata* cv.-gr. *sesquipedalis*] is of particular interest because the genome of this legume has experienced divergent domestication. Initially cowpea was domesticated from wild cowpea in Africa, subsequently, in Asia a vegetable form of cowpea, yardlong bean, evolved from cowpea. Information on the genetics of domestication-related traits would be useful for yardlong bean and cowpea breeding programs, as well as comparative genome study among members of the genus *Vigna*. The objectives of this study were (1) to develop a genetic linkage map of yardlong bean using SSR markers from related *Vigna* species (2) to locate QTLs for traits related to the phenotypic differences between yardlong bean and wild cowpea and (3) to compare them with the previously reported QTLs in closely related *Vigna*.

Two linkage maps were developed from BC₁F₁ and F₂ populations from the cross between yardlong bean (*V. unguiculata* ssp. *unguiculata* cv.-gr. *sesquipedalis*) accession JP81610 and wild cowpea (*V. unguiculata* ssp. *unguiculata* var. *spontanea*) accession TVnu457. Using these linkage maps, QTLs for 24 domestication-related traits were analyzed and mapped. QTLs were detected for traits related to seed, pod, stem and leaf.

Most traits were controlled by between one and eleven QTLs. QTLs for domestication-related traits showed co-location on several narrow genomic regions on almost all linkage groups, especially on linkage groups 3, 7, 8, and 11. Major QTLs for sizes of seed, pod, stem and leaf were principally located on linkage group 7. Pleiotropy or close linkage of genes for the traits is suggested in these chromosome regions.

This is the first report of QTLs for domestication-related traits in yardlong bean. The results provide a foundation for marker-assisted selection of domestication-related QTLs in yardlong bean and enhance understanding of domestication in the genus *Vigna*.

Student's signature

Thesis Advisor's signature