

## C2. Identification of AFLP Marker Linked to Genes Controlling Iron Deficiency Tolerance in Mungbean by Bulked Segregant Analysis.

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Kamphaeng Saen 1 (KPS1), a Thai mungbean cultivar susceptible to iron deficiency, was crossed with NM 10-12, a tolerant line from Pakistan, to dissect iron deficiency tolerance in mungbean. Single seed descent was practiced to develop 199 recombinant inbred lines (RILs) used in this study. The RILs were sown in a field having calcareous soil and iron deficiency. Chlorosis symptoms were examined between 14 to 24 days after planting. No symptom was found in 146 RILs while 53 of them were affected. The ratio of tolerant to susceptible lines in this population was 3:1. Thus, the RIL population could have 4 genotypes such as *AAll*, *aalI*, *AAii* and *aaii*, of which only *AAii* showed the symptom of iron deficiency (Srinives *et al.*, 1997). Seventy-two RILs were randomized and test-crossed using KPS1 as the tester. The test cross progenies from 32 lines were tolerant to iron deficiency while those from 40 lines were susceptible. The ratio of tolerant to susceptible lines was, theoretically, 1:1.

Bulked segregant analysis technique was employed to identify DNA markers linked to iron deficiency. Three DNA pools were generated from the RIL population. Each pool contained 15 individual plants and pooling was based on genotypes of the RILs as identified by test-crossing. DNA pool 1 comprised individuals of genotypes *AAll* and *aalI*. The two genotypes could not be separated since both were tolerant to iron deficiency, and yet their test cross progenies were also tolerant. The genotype of DNA pool 2 was *aaii* conditioning the tolerance but its test cross progenies were all susceptible. The genotype *AAii* contained in DNA pool 3 showed iron deficiency in the RILs as well as their test cross progenies. The DNA pools were analyzed using amplified fragment length polymorphism (AFLP) to identify polymorphic loci. Eight polymorphic bands were found in which DNA pool 1 and 2 followed the banding pattern of the tolerance parent while DNA pool 3 followed that of the susceptible one. All loci were found locating on the same linkage group. One locus of the gene controlling iron deficiency tolerance (most likely the A locus) was found between CGT/CTG and CAG/TAC4 markers flanking at a distance of 2.9 and 3.0 cM from the gene, respectively. While the other locus could not be identified in this study.

### Reference

- P. Srinives, S. Nopparat, R. Kaveeta and S. Jintakanon. 1997. Inheritance of Mungbean Tolerance to Microessential Element Deficiency in Takhli Soil Series. pp. 137-138. *In Proceedings of the 8th SABRAO General Congress and the Annual Meeting of The Korean Breeding Society.* Seoul, Korea. 24-28 September 1997.