

Allele-specific Expression of a Transcription Factor Gene Influences Peanut Nodulation

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Peanut as a legume species can establish a symbiotic relationship with rhizobia to fix nitrogen from the atmosphere. Over a hundred genes involved in legume symbiosis have been identified. A GRAS family transcription factor gene, *nodulation signaling pathway 2* (*NSP2*) plays a critical role in the symbiotic signaling pathway. Through a map-based cloning approach previously, two homoeologous genes, *AhNSP2-A08* or N_a and *AhNSP2-B07* or N_b were identified to control peanut nodulation. Interestingly, some peanut plants with $n_a n_a N_b n_b$ genotype produce nodules (Nod+ phenotype) and some not (Nod- phenotype). To further understand the genetic mechanism of Nod- phenotype of the $N_b n_b$ plants, allelic expression was investigated in peanut roots and flowers. The results showed that only a single allele at N_b locus was expressed in the peanut roots. In Nod- $N_b n_b$ plants, only a mutant allele n_b was expressed. In peanut flowers, N_b gene expressed significantly low in ovary than in pollen. The results indicated that the expression of N_b gene in ovary was inhibited or maternally silenced. This study firstly reported an allele-specific expression in tetraploid peanuts, which provided fundamental knowledge of epigenetic regulation in ploidy plants.