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Soybean *Ln* locus pleiotropically controls the narrow leaflet and the number of seeds per pod

*Takashi Sayama**, Western Region Agricultural Research Center, NARO, Kagawa, Japan

Takanari Tanabata, Laboratory of Plant Genomics and Genetics, Kazusa DNA Research Institute, Chiba, Japan

Tetsuya Yamada, Institute of Crop Sciences, NARO, Ibaraki, Japan

Toyoaki Anai, Faculty of Agriculture, Saga University, Saga, Japan

Ln locus in soybean is known to be responsible for the leaflet shape, and a recessive allele *ln* alters broad to narrow leaflets. The recessive allele has also been considered to increase the number of seeds per pod and has the potential to improve yield.

Recently, *Gm-JAG1*, a gene controlling *Ln* locus, has been shown to complement leaf shape and silique length in *Arabidopsis jagged* mutants. However, the function of *Gm-JAG1* remains to be determined whether the gene is responsible for those traits in soybean. In this study, we investigated the pleiotropic effect of soybean *Ln* locus on leaflet shape and the number of seeds per pod by using two independent soybean *Gm-jag1* mutants. The leaflet shape was acquired and evaluated using a leaf image analysis software, SmartLeaf, which was customized from SmartGrain. The leaflets of both the *Gm-jag1* mutants were longer and narrower than those of the wild-type plants. Interestingly, the image analysis results clarified that the perimeter of the mutant leaflets did not change, although their leaflet area decreased. Furthermore, one mutant line with narrow leaflets showed significantly increased the number of seeds per pod, indicating that soybean *Ln* locus pleiotropically controls leaflet shape and the number of seeds per pod.