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Nitrogen partitioning and N fixation in supernodulating Soybeans in field condition

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Objectives

To identify the characteristics of the nitrogen partitioning and amount of fixed nitrogen of supernoduating soybenas released from Korea and Japan in comarision with their parent genotypes in field condition.

Materials and Methods

Two supernodulating soybeans, Sakukei 4 and SS2-2, and two normal genotypes, Enrei and Sinpaldalkong 2 were examined in this experiment. The soybean seeds were hand-planted at upland soil of National Institute of Crop Science RDA in Suwon Korea on 22 May 2004 and 25 May 2005. Plot size was 5 by 4.2m. The PVC pipes 30cm in diameter and 50cm in height were buried under the ground by 5 pipes each rows in sampling plot for the fertilization of ^{15}N enriched $(NH_4)_2SO_4$. Samplings were conducted on four times, at the fifth node stage(V5), the initial flowering stage(R1), the seed development stage(R6), and the maturity stage(R8). At growth stage R8, 1.2m of unsampled row was harvested for yield components and analyzed for pod number, seed per pod, seed number, seed weight, and sample seed yield. Total N content of the plant samples were measured using an N-C analyzer and ^{15}N atom% was measured by stable isotope mass spectrometer (Isoprime-EA, Micromass) at the NICEM, Seoul National University.

Result and Discussion

Although nitrogen content in leaf, stem+petiole and root+nodule decreased with time goes by in all genotypes, it was always higher in supernodulating genotypes. But, the accumulated nitrogen of Sakukei 4 and SS2-2 was smaller than that of Enrei and Sinpaldalkong 2 at R8 stage. The total amount of Symbitically fixed nitrogen(SFN) and the fracion of SFN proportion to total nitrogen content were larger in Sakukei 4 and SS2-2 than that in Enrei and Sinpaldalkong 2 in two years.

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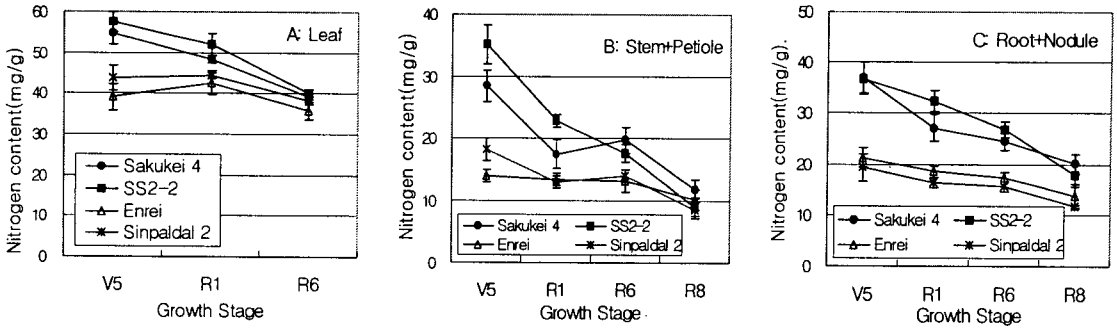

Fig. 1. Temporal changes in nitrogen content of leaf(A), Stem+petiole(B), and Root+nodule(C) of soybean genotypes(2004). Vertical bars represent standard errors of the means based on three replications.

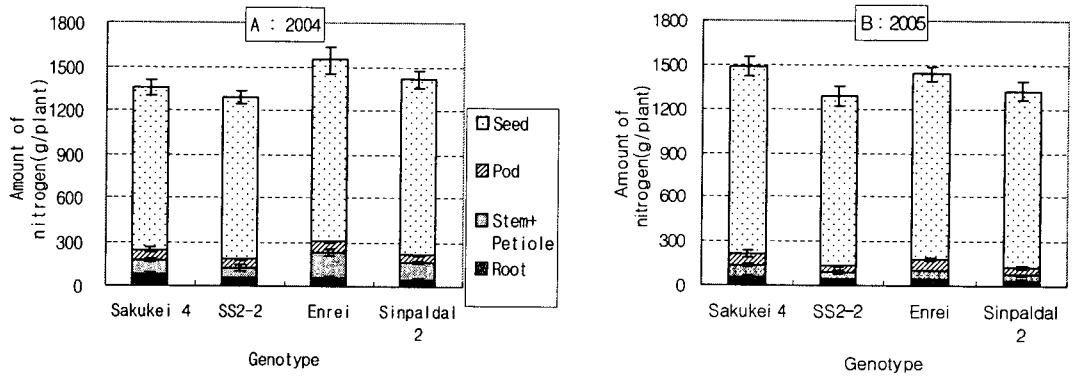

Fig. 2. Nitrogen content of soybean genotypes at maturing time in 2004 and 2005. Vertical bars represent standard errors of the means based on three replications.

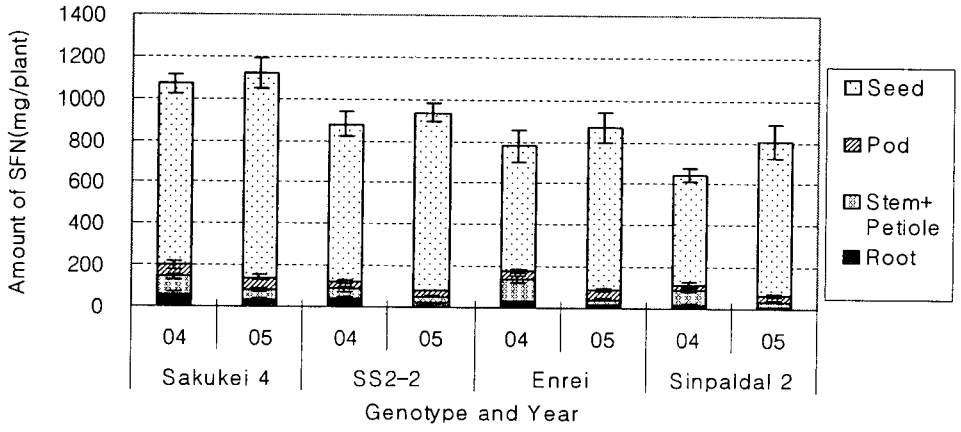

Fig. 3. The fraction of symbiotically fixed nitrogen(SFN) of soybean genotypes at maturing time in 2004 and 2005. Vertical bars represent standard errors of the means based on three replications.