（学位第３号様式）

学 位 論 文 要 旨

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題　目	Study on the role of nitrogen control on the seed production in soybean (*Glycine max* (L.) Merrill) （ダイズ子実生産における窒素制御機構に関する研究）

Soybean plants need to assimilate much nitrogen because of its high protein content in the seeds. The rapid nitrogen acquisition for the seed production during seed filling period often induces large amount of nitrogen redistribution from leaf to the seed, accelerates leaf senescence and shortens seed filling period, therefore limits the seed yield. In order to verify the mechanism of nitrogen assimilation and utilization, and find effective way to increase soybean seed yield by nitrogen control, in this research, the investigations of 1) evaluation of nitrogen redistribution from vegetative organs to the seeds, 2) varietal difference in nitrogen redistribution and its contribution to the seed yield and 3) effects of nitrogen enrichment at various growth stage on leaf nitrogen accumulation and seed yield were conducted.

About 48% nitrogen in the matured seeds in field grow soybean was redistributed from vegetative organs, and more than 60% of redistributed nitrogen was from leaves, indicating the leaves are main nitrogen storing organs. The percentage of redistributed nitrogen in the matured seeds varied from 13.8 to 37.9%, and the seed yield was correlated positively with the amount of redistributed nitrogen from leaves between 10 cultivars over 4 years. However, in some high yielding cultivar such as Tamahomare, the high seed yield was not associated with a large redistributed nitrogen, implying the direct nitrogen uptake during seed filling could be more important factor for high seed yielding depend on the cultivars. In order to make clear the relations between redistributed nitrogen from leaves and absorbed nitrogen directly from the soil during seed filling, enriched nitrogen concentration in the soil before seed filling enhanced the nitrogen content in the leaves and seed yield in the cultivar Sachiyutaka which redistributed much nitrogen from leaves to the seeds whereas showed no effects on either nitrogen accumulation in the leaves or seed yield in cultivar Tamahomare which redistributed less nitrogen from leaves to the seeds. However, enriched nitrogen concentration in the soil after seed filling increased seed yield dramatically in the cultivar Tamahomare, showing the absorbed nitrogen during seed filling was more effective on the seed yield rather than the redistributed nitrogen. The results indicated the timing of nitrogen requirement by the soybean plants is different between the cultivars depending on the property of nitrogen assimilation. It probably is the reason of inconstant effect of nitrogen top dressing at flowering time in soybean. This function was also observed by nitrogen top dressing at field condition in both years of 2011 and 2012.

In conclusion, the differences in nitrogen assimilation and its effect on the seed yield between cultivars were revealed. The results indicate the possibility to raise the seed yield potential by control the nitrogen availability depending on the property of cultivar, and could guide the soybean producer for the nitrogen top dressing during growth season.