OC5. Nitrogen Uptake and Partitioning of ^{15}N Labeled Fertilizer by Different N Application Levels in Rice Cultivars

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Objectives

This study was conducted to investigate seasonal absorption, partitioning, and use efficiency of nitrogen for improvement efficiency of nitrogen.

Materials and Methods

Materials : This experiment was carried out with two cultivars, Hwasungbyeo and Dasanbyeo.

Methods : The levels of N treatments were 6, 12, 18 kg N per 10a. Microplots ($0.81m^2$) were established for ^{15}N labeled fertilizer (urea, $(^{15}NH_2)_2CO$) application.

Results and Discussion

Hwasungbyeo were rapidly increased by increment of N fertilizer application rates. On the other hand, those of Dasanbyeo were similar in all N rates. We could estimate that nitrogen utilization differences between two cultivars were associated with total nitrogen uptake and partitioning after heading. Especially to absorb soil nitrogen through grain filling period estimated to contribute increasing yield in Dasanbyeo. Hwasungbyeo had low harvest index. As applied N fertilizer rates were increased, agronomic efficiency and partial factor productivity for nitrogen (PFP-N) were decreased. We estimated that the decrease of nitrogen use efficiency by increment N fertilizer application affected the waste of applied N fertilizer and the pollution by it.

Table 1. Nitrogen derived from fertilizer under the each nitrogen split application at heading and harvest stage in paddy field

N fertilizer rate (kg/10a)		Nitrogen derived from fertilizer (g/hill)					
		Hwasungbyeo			Dasanbyeo		
		Heading	Harvest	Increment	Heading	Harvest	Increment
6	Basal	0.03	0.05		0.03	0.05	
	TS	0.02	0.02		0.02	0.02	
	PIS	0.03	0.04		0.02	0.04	
	TNDFF	0.08	0.11	0.03	0.07	0.11	0.04
	Soil	0.36	0.57	0.21	0.33	0.54	0.21
	TN	0.44	0.68	0.24	0.40	0.65	0.25
12	Basal	0.14	0.18		0.11	0.12	
	TS	0.09	0.09		0.07	0.08	
	PIS	0.16	0.10		0.07	0.09	
	TNDFF	0.39	0.37	0.00	0.25	0.29	0.04
	Soil	0.45	0.64	0.19	0.37	0.77	0.40
	TN	0.84	1.01	0.17	0.62	1.06	0.44
18	Basal	0.10	0.23		0.23	0.21	
	TS	0.11	0.11		0.09	0.14	
	PIS	0.09	0.15		0.18	0.15	
	TNDFF	0.30	0.49	0.19	0.50	0.50	0.00
	Soil	0.67	0.87	0.20	0.27	0.82	0.55
	TN	0.97	1.36	0.39	0.77	1.32	0.55

TS: Tillering stage PIS: Panicle initiation stage TNDFF: Total nitrogen derived from fertilizer TN: Total nitrogen

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