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Growth Simulation of Ilpumbyeo under Korean Envrionment Using ORYZA2000: II Growth Simulation by New Genetic Coefficients

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Objectives

This experiment was conducted to investigate and improve the growth simulation using newly calculated genetic coefficients from Korean varieties under Korean environment with ORYZA2000.

Material and Methods

○ Variety : Ilpumbyeo

○ Dataset for growth simulation

Year	Date (day-month)		N fertilizing (kg/ha)	No. of sampling	Measured item
	Sowing	Transplanting			
2003	26 Apr	26 May	0, 60, 120, 180, 240	10	LAI, dry weight and nitrogen concentration of leaf, stem and panicle

○ Calibration : LAI, dry matter of leaves, stems, panicles and total aboveground, rough rice yield.

Summary

○ In the growth simulation without changing of module with ORYZA2000, dry matter, LAI and leaf nitrogen content(FNLV) were estimated well under high nitrogen applicated condition, but overestimated under low nitrogen applicated condition.

○ Nitrogen stress factor on the SLA was introduced into ORYZA2000 because especially overestimated LAI under low nitrogen applicated condition was originated from SLA decrease with leaf nitrogen(FNLV) decrease.

○ In the growth simulation with modified SLA modified module, LAI was estimated well under even low nitrogen applicated condition, but dry matter was hardly changed compared with default.

○ Simulated plant nitrogen content and dry matter have no clear difference between modules, but compared with observed values, panicle weight(WSO) and rough rice yield(WRR14) were overestimated under high nitrogen applicated condition because of lodging, pest, disease and low nitrogen use efficiency.

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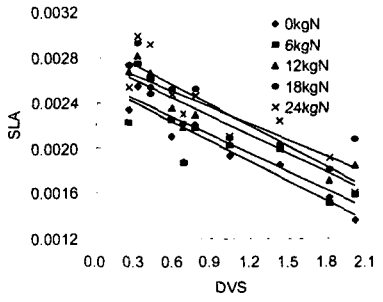

Fig. 1 Distribution of SLA according to DVS under different nitrogen treatments

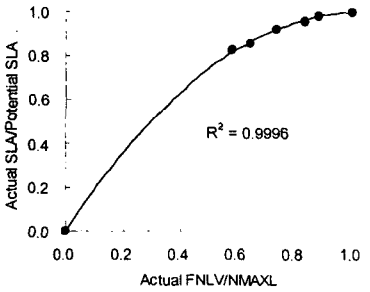

Fig. 2 Relationship between SLA and leaf nitrogen concentration.

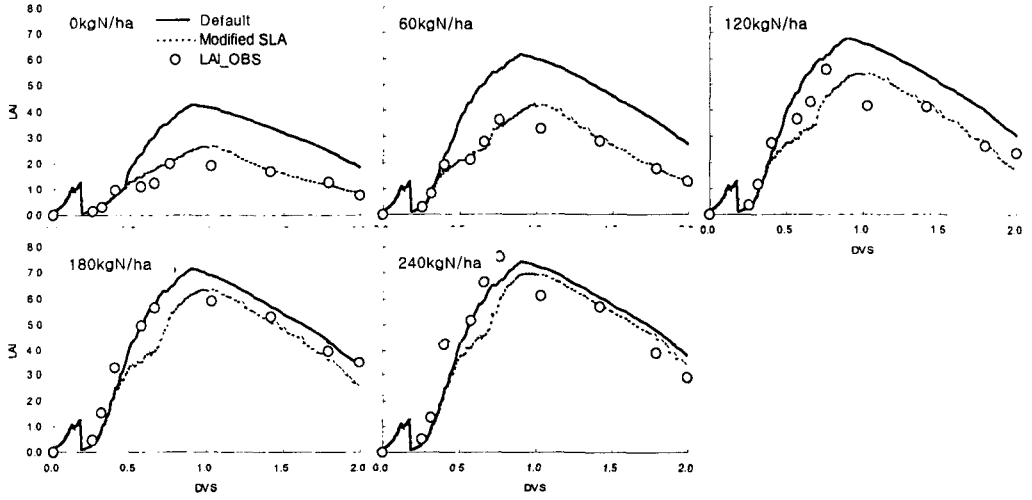

Fig. 3 Change of simulated and observed LAI according to DVS

Table 1. Dry weight of total aboveground(WAGT), storge organ(WSO), rough rice yield at 14% moisture(WRR14), and amount N in plant(ANCR) simulated by default and modified SLA with ORYZA2000

N fertilizing (kg/ha)	Module	(kg/ha)			
		WRR14	WSO	WAGT	ANCR
0	Default	4282	4316	9228	68.4
	Modified SLA	4267	4254	8591	68.5
	Observed	4363	3809	7200	53.1
120	Default	6597	6402	13630	124.7
	Modified SLA	6575	6417	13341	124.8
	Observed	7547	7002	13419	128.2
240	Default	8060	7752	15680	181.1
	Modified SLA	8050	7750	15555	181.1
	Observed	6478	7005	14727	182.0