P015

Growth Simulation of Ilpumbyeo under Korean Envrionment Using ORYZA2000: Ⅲ. Validation of Growth Simulation

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Objectives

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

Material and Methods

○ Dataset for validation of phenology

Year	Location	Latitude	Date (day-month)		N fertilizing (kg/ha)
			Sowing date	Transplanting	
2003	Suwon	37° 16	10 Apr	10 May	110
	Yuncheon	38° 08	20 Apr	20 May	
	Cungwon	36° 43	30 Apr	30 May	
	Chunchon	37° 51	10 May	9 Jun	
	Kangneung	37° 46			

○ Dataset for validation of growth simulation

Year	Location	Latitude	Date (day-month)		N fertilizing (kg/ha)
			Sowing date	Transplanting	
2003	Yeoncheon	38° 08	30 Apr	30 May	0, 50, 70, 90, 110, 140, 170
	Cheongwon	36° 43			
	Chunchon	37° 51			

Summary

○ In the phenology model of ORYZA2000, the effect of photoperiod on the developmental rate was a little ignored because most crop parameters were measured with IRRI varieties which are insensitive to photoperiod, therefore it is very difficult to apply this phenology model directly to Korean varieties which are usually sensitive to photoperiod.

○ After introducing PPFAC and PPSE to improve the phenology model, the precision of heading date prediction was improved but not satisfied.

○ In the growth simulation using data from several regions, yield tended to be overestimated under high nitrogen applicated condition.

○ The precision of yield was much improved by introducing nitrogen use efficiency, but still different between regions because of different soil fertility or property of irrigation water between regions

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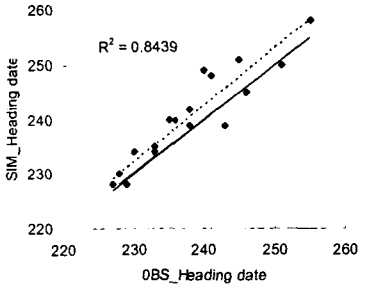

Fig. 1 Relationship between observed and simulated heading date when the effect of photoperiod on rice phenology was not considered.

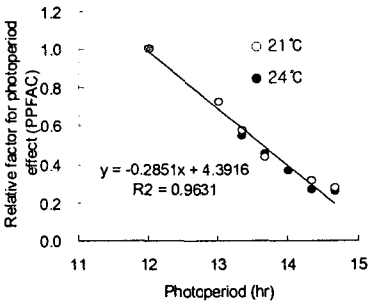

Fig. 2 Relationship between photoperiod and PPFAC which is calculated from ratio of invers of photoperiod sensitive phase at actual to optimum photoperiod.

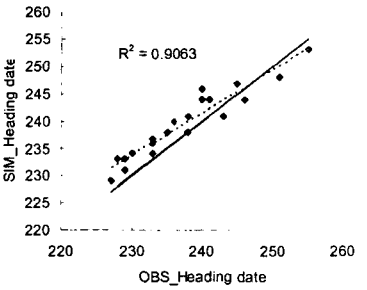

Fig. 3 Relationship between observed and simulated heading date when the effect of photoperiod on rice phenology was considered.

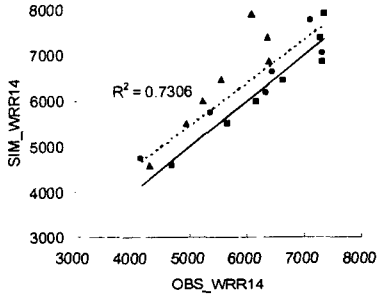

Fig. 4 Relationship between simulated and observed rough rice yield(WRR14) without considering about total absorbed nitrogen content.

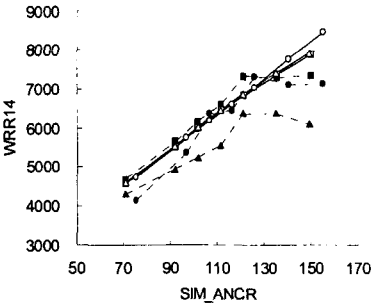

Fig. 5 Relationship between total absorbed nitrogen content(ANCR) and rough rice yield(WRR14).

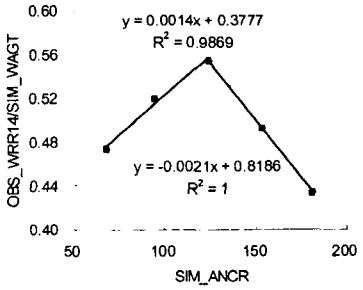

Fig. 6 Relationship total absorbed nitrogen (ANCR) and harvest index (WRR14/WAGT).

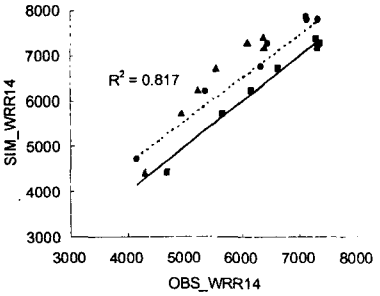

Fig. 7 Relationship between simulated and observed rough rice yield(WRR14) with considering about total absorbed nitrogen content.