

Difference of Growth Phases and Quality of Soybean in Paddy and Upland

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Objectives

In recently soybean area in paddy field has increased tremendously due to the rice production adjustment by the government, but little information exists regarding the comparison of growing habits and seed quality of soybean grown on the upland and the paddy field. The research objectives are to compare the growth phases and quality of soybean grown between upland and paddy field.

Materials and Methods

This experiment was conducted on upland and paddy field at Suwon, Gyeonggi province in 2003 using five cultivars. The cultivars include Pungsan and Sowon(for sprouting), and Taekwang, Daewon, Shinpaldal#2(for paste & Tofu). The seeds were planted on 28 May with planting density of 70 x15cm. Two seedling per hill were grown by thinning before V3 stage. Fertilizer was surface application prior to planting at a rate of 30-30-34(N-P₂O₅-K₂O)kg/ha according to standard recommendation

Table 1. Property of paddy and upland soil used in this experiment

Field	Chemical property			Physical property(%)		
	pH	O.M (g/kg ⁻¹)	P ₂ O ₅ (mg/kg ⁻¹)	Solid	Liquid	Gaseous
Paddy	5.4	2.6	130	43.1	33.1	23.7
Upland	6.4	1.5	335	46.9	15.4	37.6

Results and Discussion

In this experiment there are great differences in chemical and physical property of soil between upland and paddy field, mostly the amount of organism matter, and gaseous condition of physical property. Flowering occurs in 66days after planting at upland field, and in 64days at paddy field. The reproductive period and the growth period of plants in paddy was prolong for 7 and 5day, respectively when compared to upland. Soybean seeds produced in paddy showed clearly higher in seed weight, protein content and isoflavone content than those from upland field. The seed weight in upland averaged at 16.9g/100seeds, the range of 9.4 to 24.6g, and in paddy averaged at 20.6g/100seeds, the range of 12.9 to 27.4g. However, lipid content in paddy field was similar to that of the upland(Table3). There was positive correlation between the ratio of maturation period to growth duration and yield.

Table 2. Comparison of growth phases between paddy and upland

Varieties	Vegetative stage		Reproductive stage		Growth duration	
	Upland	Paddy	Upland	Paddy	Upland	Paddy
Pungsan	71	70	69	73	140	143
Sowon	71	64	66	77	137	141
Taekwang	68	65	63	71	131	137
Daewon	65	63	73	79	138	142
Shinpaldal#2	57	57	74	81	131	138
Average	66	64	69	76	135	140

Table 3. Comparison of seed weight, protein, lipid and isoflavone between paddy and upland

Varieties	Seed weight(g/100)		Protein(%)		Lipid(%)		Isoflavone($\mu\text{g/g}$)	
	Upland	Paddy	Upland	Paddy	Upland	Paddy	Upland	Paddy
Pungsan	10.2	13.0	36.3	41.0	17.4	16.3	1,254	1,093
Sowon	9.4	12.9	35.9	37.9	18.2	17.1	1,865	1,991
Taekwang	20.4	26.5	36.6	39.8	18.1	17.1	957	1,261
Daewon	24.6	27.4	38.6	40.8	18.5	17.7	1,815	1,954
Shinpaldal#2	20.3	23.4	39.4	41.2	17.1	17.4	1,453	1,594
Average	16.9	20.6	37.4	40.1	17.8	17.1	1,469	1,579

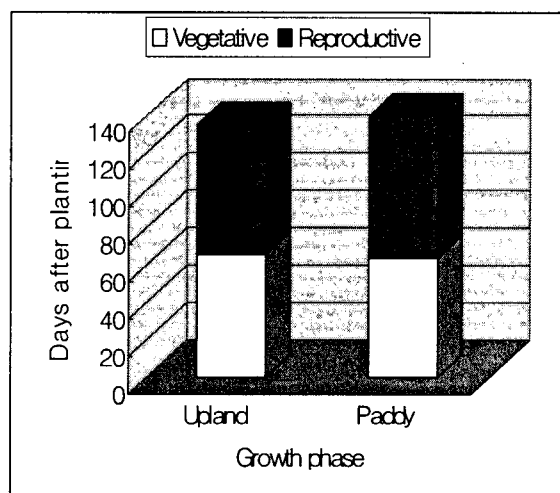


Fig 1. Comparison of growth phases between upland and paddy.

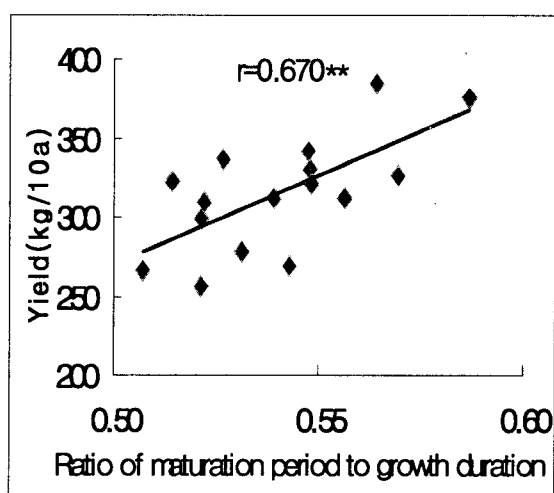


Fig 2. Relationship between yield and ratio of maturation period to growth duration