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Evaluation of Black Plastic Film Mulching on Weed control and Rice Growth in Paddy

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Objectives

This study was carried out to investigate weed control and rice growth by black plastic film mulching at paddy in 2005.

Materials and Methods

○ Experimental material

- Rice cultivar : Daeanbyeo
- Mulching material

  Plastic film mulching: Black plastic film (1.90m X 195m X 0.02mm)

  Paper mulching: Recycled paper + biodegradable PES(1.90m X 195m X0.02mm)

○ Treatments

- Conventional cultivation, Paper mulching, Plastic film mulching

○ Cultivation practice

Nursery period Seedling type	Transplanting date	Planting density(cm)	Applied fertilizer	N application amount(kg ha^{-1})
30 days (broadcast-box raising seedling)	26. May	30 × 14	Controlled-release fertilizer, LCU(18-7-9)	88

- Transplanter : The 6 row riding transplanter attached with mulching paper was produced by Kukje machinery Co.

Results

○ The missing hill was higher at the black plastic film plot than at the paper mulch plot. The tiller number of rice at conventional plot was less than at mulching plots during growing season.

○ The weed controls of midpoint and edges of paper mulching plot were 92.4% and 86.1%, respectively. The weed controls of midpoint and edges of black plastic film mulching were 100% and 98.2%, respectively. Main occurrence weeds as follows : *Eleocharis kuroguwai, Lindernia procumbens, Scirpus juncoides, Ludwigia prostrata, Monochoria vaginalis, Cyperus difformis* **etc.**

○ The rice yield was not different at all treatments except the control plot.

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Table 1. The missing hills and growth characteristics of rice by different mulching transplant

Treatment	Missing hill (%)	32 DAT[1)]		62 DAT		88 DAT		Heading date
		Plant height (cm)	Tiller No. (m^2)	Plant height (cm)	Tiller No. (m^2)	Plant height (cm)	Tiller No. (m^2)	
Conventional	4.0	39.0	574	59.3	443	98	398	17 August
Paper mulching	3.7	41.2	736	63.1	479	101	431	17 August
Plastic Film mulching	6.0	39.5	648	61.6	483	99	443	20 August

1) DAT : days after transplanting

Table 2. Number of several dominant weeds, dry weight, and weed control by different mulching transplant of rice

Treatment	Occurrence weeds(no. /m^2)							Dry weight (g/m^2)	Weed control(%)
	Ek[1)]	Lp	Sj	Lu p	Mv	Cd	Other		
Conventional	0.0	0.0	0.0	1.1	24.4	0.0	1.1	7.6	93.8
Paper mulching									
Midpoint	17.8	7.8	0.0	3.3	4.4	0.0	0.0	9.2	92.4
Edge of two mulching	3.3	8.9	7.8	2.2	0.0	2.2	3.3	16.9	86.1
Plastic Film mulching									
Midpoint	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Edge of two mulching	0.0	0.0	1.1	0.0	3.3	0.0	0.0	2.2	98.2
Control	1.9	20.4	0.0	442.6	37.0	14.8	9.3	121.1	-

1) Abbreviations : Ek : ***Eleocharis kuroguwai***(올방개) Lp : ***Lindernia procumbens***(밭뚝외풀)
Sj : ***Scirpus juncoides***(올챙이고랭이) Lu p : ***Ludwigia prostrata***(여뀌바늘)
Mv : ***Monochoria vaginalis***(물달개비) Cd : ***Cyperus difformis***(알방동사니)

Table 3. Yield and yield components by different mulching transplant of rice

Treatment	Panicle no. (m^2)	Ripened grain (%)	Spikelet no.(no.panicle^{-1})	1,000 grain wt.(brown rice ; g)	Milled Rice (kg ha^{-1})	Straw weight (kg ha^{-1})	Weeds dry matter (kg ha^{-1})
Conventional	398.0	91.9	72.3	23.0	5360 a	6840	177
Paper mulching	436.9	89.9	80.3	20.1	5370 a	6720	11.4
Plastic Film mulching	427.4	88.6	78.6	22.1	5380 a	6950	6
Control	358.3	76.5	64.3	20.6	1760 b	4020	2,024