

쌀 수량과 품질에 미치는 자운영 역할

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Effects of Chinese Milkvech as Green Manure Crops on Yield and Eating Quality in Rice

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연구목적

- 친환경농업 정착을 위해 자운영의 화학비료 대체 여부와 자운영 영속유지기술 정착
- 자운영을 재배할 경우 쌀 수량과 미질형질의 변화 구명

재료 및 방법

- 시험기간 : '95~'05
- 재배방법 - 시험품종 : 동진1호('05), 주남벼('04), 일미벼('95~'03)
 - 이앙시기 : 6월 5일~7일(30일 묘)
 - 자운영 투입량(건물중) : ('04)386kg/10a, ('05)240kg/10a
 - 표준재배법에서 화학비료 시비량 : 11-4.5-5.7kg/10a

시험결과 요약

- 자운영 영속유지는 논 경운 작업을 5월 말경에 하고, 6월 상순에 벼를 이앙할 경우 가능하였음.
- 자운영을 녹비로 활용할 경우 화학비료를 대체할 수 있을 만큼의 3요소가 투입되었음.
- 화학비료를 시용할 때와 비교하여 자운영을 녹비로 활용할 경우 수량은 같았으나, 완전미 수량은 높았으며, 단백질 함량은 낮고, 식미치는 높았음.

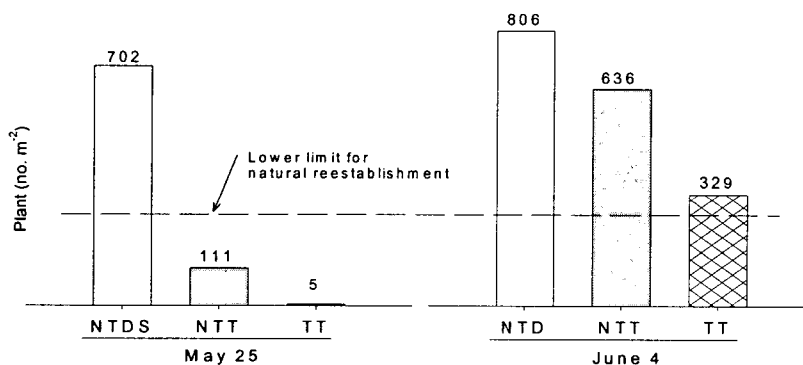


Fig 1. Stand establishment of chinese milkvech after rice harvesting as affected by cropping time and cultivating method. NTDS, no-till direct seeding; NTT, no-till transplanting and TT, tillage transplanting

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Table 1. Green manure and nutrient yield of reestablished chinese milkvetch as affected by cropping times and cultivating methods of rice on the next year

Cropping time	Cultivating method	Yield of green manure (ton/ha)	Ratio of dry matter (%)	Dry matter (kg/10a)	Nutrients [†] (kg/10a)		
					N	P ₂ O ₅	K ₂ O
May 25	NTDS	54.7	10.3	5,650	165	42	242
	NTT	25.1	11.2	2,820	82	21	121
	TT	1.0	12.9	130	4	1	6
June 4	NTDS	71.3	9.5	950	196	50	288
	NTT	69.9	9.5	950	193	49	283
	TT	29.7	10.1	1,010	87	22	128

[†] Nutrient concentration in chinese milkvetch : N (2.92%), P₂O₅ (0.74%), K₂O (4.28%).

Table 2. Effects of green manure crops on yield and eating quality in rice.

Methods of supplying fertilizer	Brown rice ratio (%)	Yield (kg/10a)	Head rice ratio (%)	Head rice yield (kg/10a)	Amylose (%)	Protein (%)	Palatability value
CMGP ^b	80.8	564 (99)	73.9	417	19.1	7.4	74.3
WGP	81.5	503 (88)	82.6	415	18.9	6.7	76.5
CF	81.0	570(100)	70.7	403	18.9	7.7	73.0
Non-fertilizer	81.7	444 (79)	86.7	385	19.1	6.3	76.6

^b CMGP, chinese milkvetch as green manure crop; WGP, wheat as green manure crop; CF, chemical fertilizer.

Table 3. Change in redox potential of paddy soil as affected by using methods of chinese milkvetch as green manure crop. (mV)

Treatment	Days before sowing			Days after sowing					
	25	17	9	10	12	14	16	19	50
Vetch-stand reserved	-350	-223	-182	-116	-148	-96	36	48	-117
Vetch-sward removed				-48	32	0	44	100	-40
Vetch-sward desiccated				-64	-28	-80	76	24	-110
Vetch-sward ploughed				-68	-4	64	44	-12	-3
Conventional (no-vetch, tilled)				-53	-12	40	44	28	13

*50 : Maxum tillering stage

Table 4. Weeds occurred at maximum tillering stage in different vetch-sward treatments.

Treatment	Weeds(D.W.g /m ²)						
	Ec ¹	Cd	Ph	Ri	Lj	Aa	Total
Vetch-stand reserved	10.1	-	3.7	-	4.2	-	18.0
Vetch-sward removed	11.7	-	-	0.1	-	-	11.8
Vetch-sward desiccated	0.4	-	-	-	-	-	0.4
Vetch-sward ploughed	-	2.8	0.4	0.1	-	-	3.3
Conventional (no-vetch, tilled)	-	1.8	0.1	0.4	0.1	0.2	2.6

¹ Ec, *Echinochloa crus-galli*; Cd, *Cyperus difformis*; Ph, *Polygonum hydropiper*; Ri, *Rorippa islandica*; Lj, *Leersia japonica*; Aa, *Alopecurus aequalis*.