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Effect of Soil-incorporated Chinese Milk Vetch on Early Growth of Corn

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Objectives

Chinese milk vetch (CMV), a promising legumes cover crop, is commonly used in paddy fields. In upland crop field, however, the use of CMV as cover crop is relatively rare. Because it is feasible to use CMV as cover crop in summer upland crop like soybean and corn, the potential of CMV as green manure cover crop should be evaluated. Corn needs a relatively large amount of nutrient during vegetative growth. This study was aimed to know the effect of CMV cultivation as green manure crop followed by corn.

Materials and Methods

Chinese milk vetch sown in previous year was clipped at different growth stages before flowering, initial flowering and full-blooming stage. The clipped CMV biomass was air-dried and chopped into small particles less than 2 mm. The ground CMV litter was incorporated into soil by the rate of 600 kg $10a^{-1}$. After incorporation of CMV litter into soil packed in pot, corn (cv. Chalok #1) was seeded and grown without fertilization. Leaf N content was determined by kjeldahl method. Leaf chlorophyll content was measured by spectrophotometer after extraction with 80% acetone and also determined nondestructively by SPAD meter.

Results and Discussion

○ CMV clipped at different growth stage influences on the leaf N content in corn plant. CMV clipped on April 23 showed greater effect on the leaf N content of corn than those clipped on April 27 and May 11. This result showed similar tendency of leaf chlorophyll content of corn plant. Chlorophyll content was highly increased by the treatment of CMV litter clipped at the early growth period of corn plant. However, the effect was lessened after 28 days after treatment regardless of clipping timing.

○ Quantitative growth parameters of corn was showed persisting effect of CMV incorporation until 47 days after treatment regardless of CMV clipping timing. There was no significantly different effect on corn growth between two clipping timing, April 13 and April 27.

○ Poor growth of corn observed in untreated control may due to the shortage of N supply that was not observed in CMV treated corn plants. Therefore, the N-supplying ability of CMV clipped at different timings was enough to promote early corn growth although the degree of growth promoting was various depending on clipping timing.

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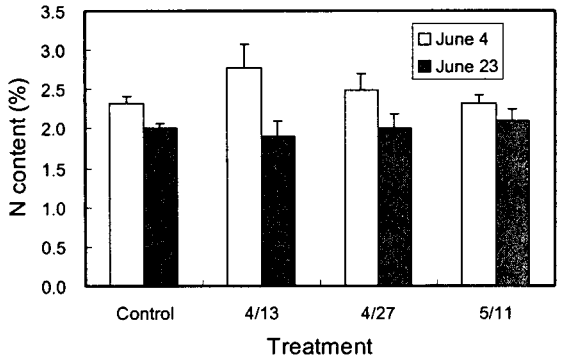

Fig. 1. Leaf N content of corn plant grown in soil incorporated with CMV litters harvested at different growth stages.

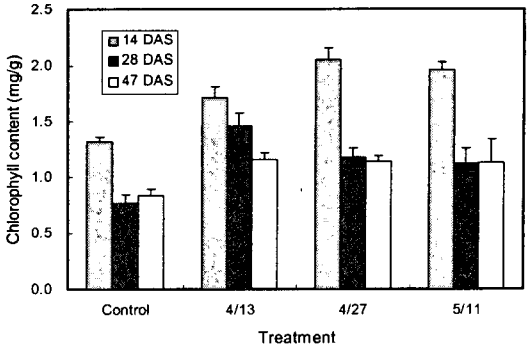

Fig. 2. Leaf chlorophyll content of corn grown in soil incorporated with CMV litters harvested at different growth stages..

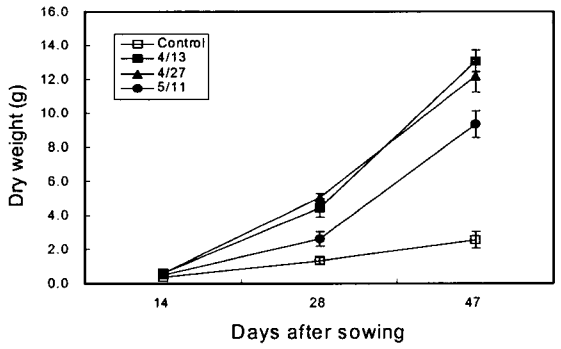

Fig. 3. Changes of plant height of corn grown in soil incorporated with CMV clipped at different growth stages.

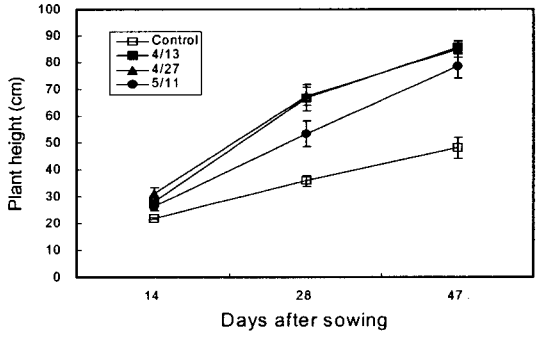

Fig. 4. Changes of corn cry weight treated with CMV clipped at different growth stages.

Table. 1. Effect of CMV litter harvested at different growth stages on corn growth on May 21

Treatment	SPAD	Plant height (cm)	Fresh weight (g)	Dry weight (g)
Control	34.3c	21.9c	3.5c	0.36c
4/13	44.0a	28.1b	6.2a	0.62a
4/27	44.1a	31.1a	6.9a	0.63a
5/11	40.8b	26.4b	4.9b	0.48b

Table 2. Effect of CMV litter harvested at different growth stages on corn growth on June 4

Treatment	SPAD	Plant height (cm)	Fresh weight (g)	Dry weight (g)
Control	18.2c	35.8c	9.6c	1.34d
4/13	33.5a	66.7a	35.4a	4.43b
4/27	26.6b	67.5a	37.6a	5.01a
5/11	24.6b	53.2b	21.4b	2.60c