

7. Effect of Cropping Seasons of Soybean on Succeeding Rice Crop (1978—1979)

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In the Experiment IV-6, soybean was grown in 5 cropping seasons seeded in the middle of every month starting from December 1978 to April 1979 to find out the optimal cropping season of soybean under dry season cultivation. The present experiment was carried out to examine the effect of the different cropping seasons of soybean on growth and yield of the succeeding rice crop.

Materials and method

The experimental field, where the Experiment IV-6 was carried out, was used disposing the growing seasons of the preceding soybean crop as the plots with 4 replications. However, disposition of the plots was not randomized because of the reason described before (see the layout of the Experiment IV-6).

1. Treatments

In addition to 5 cropping seasons of soybean mentioned above, a treatment under which the field was kept fallow in the dry season was added. Thus, the treatments consist of:

- 1) Fallow
- 2) December 15, 1978 — March 28, 1979 (146 days)*
- 3) January 15 — April 23 (120 days)*
- 4) February 15 — May 31 (82 days)*
- 5) March 15 — June 29 (53 days)*
- 6) April 16 — August 1 (20 days)*

* Figures in parentheses indicate the number of days from soybean harvest to rice transplanting.

2. Plot size: 62 m² (8.25 m × 7.5 m)

3. Cultivation of rice

- 1) Variety: RD 7
- 2) Transplanting time: August 21, 1979
- 3) Fertilizer application:
 - Basal dressing: N: 20, P₂O₅: 15 (kg/ha)
 - Top dressing: N: 5 kg/ha
- 4) Spacing: 25 cm × 25 cm, 3 seedlings/hill
- 5) Harvesting time: October 27 — 29, 1979

Results

1. There was not a big difference in growth and yield of rice among the plots. In the plots where soybean was grown during the period from February to May (No.4) and from March to June (No.5), rice growth was somewhat inferior to other plots at later growth stage as indicated in less top dry weight and number of panicles per hill. Thus, these two plots yielded lower than others (Table 7-1 and 2).

2. Relationship between the yield of rice and that of preceding soybean was examined in Fig.7-1, but no correlation was found.
3. Ammonium nitrogen content of soil was analysed before rice transplanting as shown in Table 7-3, but no correlation was recognized between rice yield ($r = 0.376$ in case of dried soil: $r = 0.329$ in case of fresh soil).

Discussion

The experiment which was carried out by Takahashi et al.* in 1976 revealed that rice yielded the highest under the cropping pattern of 'soybean-rice' when the interval between soybean harvest and rice transplanting was less than 2 months. The results of the present experiment, however, were different from those mentioned above. The discrepancy might be connected with the soil fertility gradient within the experimental field because the plot layout was not randomized.

Thus, the data obtained so far are not enough to be conclusive regarding the effect of the period from soybean harvest to rice transplanting, but another aspect has to be taken into account for planning the cropping season of soybean. That is, the season from January to April is best to stabilize soybean yield by escaping insect injuries as reported in the Experiment IV-6.

Table 7-1. Rice growth in relation to preceding cropping season of soybean

Soybean cropping season	Plant height (cm)		Number of tillers (No./hill)		Top dry weight (g/m ²)		N content of leaves (%)		Heading date
	Sep. 20	Oct. 30	Sep. 20	Oct. 30	Sep. 20	Oct. 30	Sep. 20	Oct. 30	
1) Fallow	48	106	15	14	94	648	1.60		Oct. 29
2) Dec. 15—Mar. 28	49	108	14	14	106	690	1.58	1.13	29
3) Jan. 15—Apr. 23	49	106	17	14	118	660	1.44	1.15	28
4) Feb. 15—May 31	51	106	17	13	128	620	1.18	1.12	27
5) Mar. 15—Jun. 29	51	106	16	13	118	621	1.08	1.01	27
6) Apr. 16—Aug. 1	50	106	17	14	122	671	1.37	1.08	29

Remarks: 1) Transplanting: August 21, 1979.

2) Nitrogen content of September 20 shows that of the top part of the whole plant.

* IV-2. Effect of preceding upland crops on growth and yield of rice.

Table 7-2. Yield component and yield of rice in relation to preceding growing season of soybean

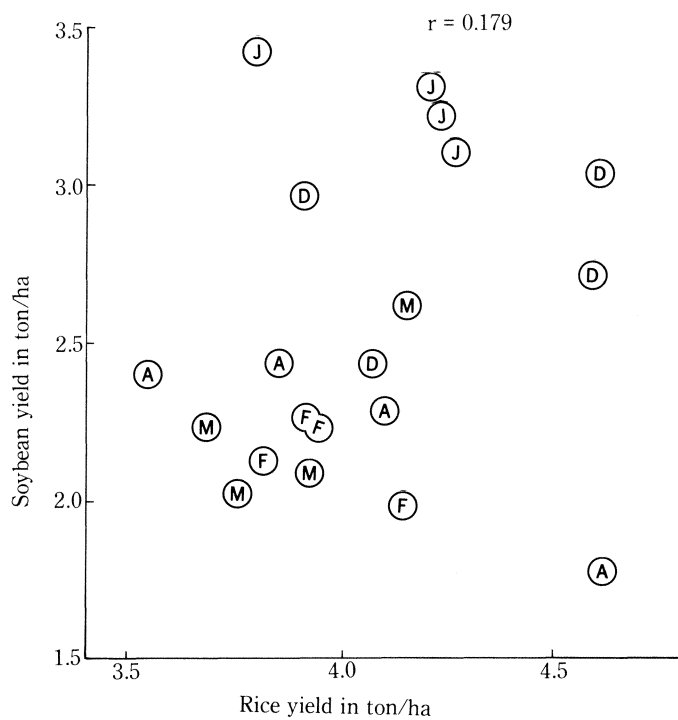
Soybean growing season	Number of panicles	Number of spikelets	% of ripened grains	1,000 full grain weight	Full grain yield
	no./hill	no./panicle	%	g	ton/ha
1) Fallow	12.5	83.8	78.7	28.4	4.31
2) Dec. 15—Mar. 28	12.9	78.2	77.6	28.9	4.31
3) Jan. 15—Apr. 23	12.4	78.9	80.9	28.5	4.13
4) Feb. 15—May 31	11.8	77.9	82.0	28.4	3.95
5) Mar. 15—Jun. 29	11.5	79.4	82.1	28.3	3.89
6) Apr. 16—Aug. 1	12.1	79.6	83.6	29.8	4.03

Remarks: 1) Harvesting: November 27, 1979
 2) Number of spikelets was counted for grains sunk in water.
 3) Weight of full grains is based on 14% moisture content.

Table 7-3. Ammonium nitrogen contents in soil after incubation at 40°C for 4 weeks under submerged condition

Soybean season	Moisture (%)	MH ₄ -N (mg/100g. dry soil)	
		Dried soil*	Fresh soil**
1) Fallow	24.04	5.26	2.30
2) Dec. 15—Mar. 28	23.05	4.08	1.74
3) Jan. 15—Apr. 23	23.94	8.15	2.28
4) Feb. 15—May 31	24.13	2.96	2.05
5) Mar. 15—Jun. 29	23.83	3.33	2.21
6) Apr. 16—Aug. 1	21.85	4.82	2.44

Remarks: 1) Soil samples were taken from a surface layer of 10 cm depth before rice transplanting, on August 15, 1979.
 2) *: Fresh soil samples submerged after dried at room temperature.
 **: Fresh soil samples submerged immediately.



Remarks: D, J, F, M and A indicate the months in which soybean was planted.

Fig. 7-1. Relationship between yields of rice and preceding soybean crop