

RESEARCH ON THE TECHNIQUES FOR SESAME DEVELOPMENT IN CROP ROTATION SYSTEM WITH RICE ON GREY SOIL IN THE PLAIN OF REEDS

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Grey soil is a main soil group in the Plain of Reeds which distributed in the highest topography of the area. Most of this soil has been used to grow rice in monoculture system (Winter Spring - Summer Autumn rice crops). As a result, soil has been degraded and the economic return has strongly decreased. After harvesting Winter- Spring rice crop, the land has been oftenly fallowed by 70-90 days before the second rice crop starting. Sesame crop was introduced and rotated with this system (Winter Spring rice - Spring Summer sesame - Summer Autumn rice). This new crop rotation system proved as a suitable cropping system bringing high economic return to farmers. Technical components for sesame cultivation were tested and established. Application of the improved techniques could increase yield to 155.5% and economic return to 197.0% compared to the existing technique of farmers. The improved techniques of sesame cultivation were preliminarily introduced to farmers and local authorities in the area via field visits, training courses, leaflets, which have been highly accepted.

1. BACKGROUND

In the Plain of Reeds, Winter Spring - Summer Autumn rice crops was a main crop system on grey soil. After harvesting Winter Spring rice crop, the land has been fallowed by 70-90 days before the Summer Autumn rice crop starting. Recently, sesame has been grown on grey soil in the Plain of Reeds. However, this production is unprompted, mainly followed by individual experiences.

Therefore, research on techniques to develop sesame in cropping system with rice on grey soil in the Plain of Reeds is needed and meets the requirement of the production.

2. CONTENTS AND RESEARCH METHODS

The study was carried out at Tan Hiep village, Thanh Hoa district, Long An province. Sesame varieties and technical components were tested. RCBD experiment with 3 replications and plot size of 10-30m². Trials were followed by large plot without replication in plot size of 500-1,000m². The size of the trial model for



improved cultivation techniques was 3 ha. The experiments and trials were conducted in Spring Summer crop 2006 and Spring Summer crop 2007.

3. RESULTS AND DISCUSSION

3.1. Comparison experiments of some promising sesame varieties

The results of the experiment on sesame varieties (Table 1) showed that the growth duration of tested varieties was short (73-76 days), it was suitable for rotation system of Winter Spring rice - Spring Summer sesame - Summer Autumn rice. Of the tested varieties, V6 gave highest yield and highest oil content (52.6%).



Table 1. Characteristics of some sesame varieties on grey soil in the Plain of Reeds

Variety	Plant height (cm)	Days to flowering (days)	Growth duration (days)	Grain yield (t/ha)	Oil content (%)
VDM2	113	32	73	1.30 ab	49.1
VDM10	110	32	75	1.17 ab	49.3
V36	108	30	74	1.40 ab	50.1
Local variety	105	29	74	1.32 ab	47.6
VDM6	112	31	76	1.13 b	49.1
VDM7	108	31	76	1.08 b	49.4
V6	110	30	75	1.49 a	52.6
CV (%)				14.8	

3.2. Technical components trial

Land preparation for sesame showing gave higher yield (0.96-1.06 t/ha) than that compared to without land preparation (0.49 t/ha). Ploughing combined with seed broadcasting and without straw cover gave highest economic return (2,882,000 VND/ha).

There was not statistically significant difference between NPK dose treatments. On the economic aspect, application of 90N-60P₂O₅-90K₂O gave highest net economic return (6,702,000 VND/ha). In kind of phosphorus fertilizers, treatment with 50% Super phosphate + 50% NPK gave highest yield and economic return (Table 2).

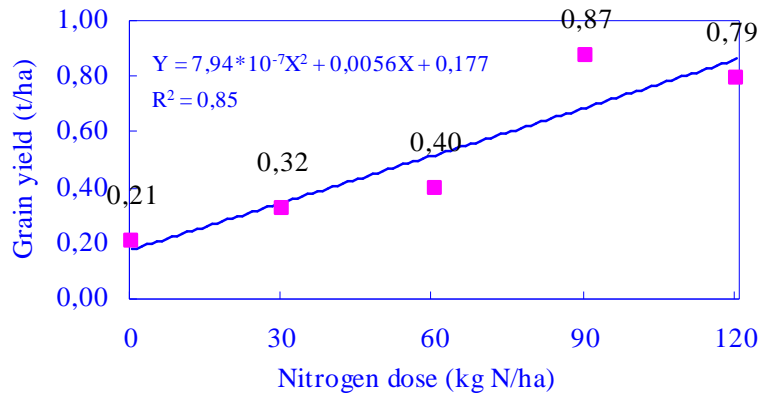


Figure 1. Effect of nitrogen on sesame grain yield

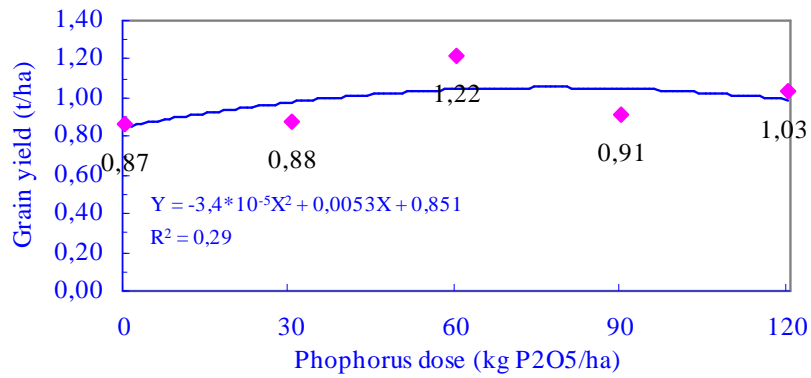


Figure 2. Effect of phosphorus on sesame grain yield

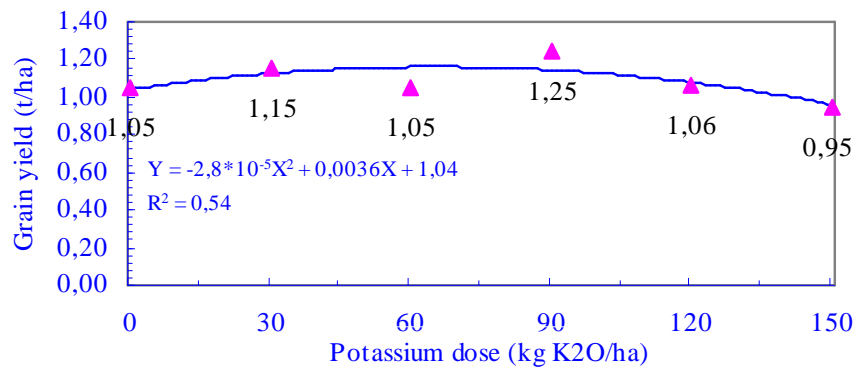


Figure 3. Effect of potassium on sesame grain yield

Table 2. Effect of kinds of phosphorus fertilizers on sesame yield and economic return

Treatments	Grain yield (t/ha)	Total cost (VND/ha)	Total income (VND/ha)	Economic return (VND/ha)
100 % DAP (check)	1.43 b	6,375,000	11,480,000	5,105,000
100 % NPK (20-20-15)	1.53 ab	6,604,000	12,232,000	5,628,000
50% Super phosphate + 50% DAP	1.68 ab	6,767,000	13,440,000	6,673,000
50% Super phosphate + 50% NPK	1.94 a	6,750,000	15,520,000	8,770,000
50% Thermophosphate + 50% DAP	1.51 ab	6,707,000	12,056,000	5,349,000
50% Thermophosphate + 50% NPK	1.47 ab	6,690,000	11,736,000	5,046,000
50% DAP + 50% NPK	1.42 b	6,622,000	11,400,000	4,778,000
CV (%)	16.83			

Sesame price: VND 8,000/kg

3.3. Improved cultivation process trial

In large plot, the improved cultivation process gave the yield of 155.3% higher than those of the farmers' practice (Table

3). The increment of the economic return of the model applying improved process was 704.3% compared to those of farmers' practice (Table 4).



Table 3. Effect of improved cultivation process on sesame yield on large plot

Treatment	Grain yield (t/ha)	Increment compared to check (t/ha)	Increment compared to check (%)
Farmer's practice (check)	0.45	-	-
Improved cultivation process	1.15	0.70	155.5

Table 4. Improved cultivation process on test production

Treatment	Grain yield		Economic return	
	T/ha	Increment compared to check (%)	VND/ha	Increment compared to check (%)
Farmer's practice (check)	0.67	-	350,000	-
Model of cultivation process	1.20	79.1	2,815,000	704.3

4. CONCLUSIONS

- Sesame could be grown in Spring Summer crop in the rotation system with Winter Spring and Summer Autumn rice crops on grey soil in the Plain of Reeds. The economic return of this system increased 30% compared with traditional two rice crops per year.
- V6 and V36 varieties are suitable on grey soil in the Plain of Reeds.

- Land preparation by rotation ploughing gave high yield and economic return.
- Application of 90N-60P₂O₅-90 K₂O gave highest yield and economic return.
- Combining 50% Super phosphate and 50% NPK (20-20-15) was the best rate for sesame.
- Applying improved cultivation process could increase yield to 155.5% compared with farmer's practice