The Effect of Pre-emergence Herbicide and Method of Planting on Weed Population and Yield of Mungbean in Farmer Fields.

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ABSTRACT

Mungbean variety M7A was planted in the farmer field in Bangpae district of Rachaburi Province in a split-split plot experiment. Main plots consisted of two fertilizer treatments, with fertilizer mixture of 16-20-0 at the rate of 312.5 kg/ha, and without fertilizer. Methods of planting of broadcasting seeds, and drill planting mungbean in row using row specing of 50 cm. were two sub plots. The sub-sub plot consisted of treatments receiving and not receiving pre-emergence herbicide, inwhich alachlor at the rate of 2.15 kg(ai)/ha was applied as herbicide treatment immediately after seeds were planted. Mungbean was planted in May as the crop before rice in mungbean-rice cropping system pattern.

Weed competition was serious when mungbean was planted in early rainny season. Application of pre-emergence herbicide reduced weed numbers significantly. The yield of mungbean planted by drilling was significantly higher than broadcasting. Application of pre-emergence herbicide significantly increase mungbean yield. If weed could not be controlled, the application of fertilizer would reduce mungbean yield by enhanced weed competition.

INTRODUCTION

Weed competition is a major problem in mungbean production when planted before rice crop in Central Thailand. Rainfall which started early May enhanced weed growth and its competition to mungbean production tremendously in Bangpae district, 100 km. south of Bangkok (Pookpakdi et al., 1979). The yield loss of mungbean up to 95 percent was obtained in rainy season in the Philippines and up to 60 percent in spring in Taiwan (Asian Vegetable Research and Development Center, 1976; Castin, 1976). However, in the dry season, competition from weed was considerably low.

Controlling weed in mungbean fields was found difficult since farmers generally broadcasted their seeds rather than planted mungbean in rows. Broadcasting results in uneven distribution of plants and make it difficult for farmers to do hand weeding. Row planting mungbean appears to be advantageous over broadcasting due to several reasons; firstly, plants received more uniform spacing which allowed them to express their yield potential better, hence, higher yield would be obtained. Secondly,

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weeding mungbeans in rows could be done easily by farmers. However, the main reason why farmers are unwilling to plant mungbean in rows instead of broadcasting is due to the fact that they would not like to increase their production cost due to weeding especially when the yield advantage of planting mungbean in rows over broadcasting has not been clearly established. The use of pre-emergence herbicide in row planting mungbean may offer lesser input for farmers comparing to the labor cost in weeding.

This experiment was conducted inorder to study the effect of pre-emergence herbicide in controlling weeds of mungbean grown by broadcasting and row planting in farmer's field.

MATERIALS AND METHODS

A split-split plot experiment replicating three times was conducted in the farmer's field at Bangpae district on May 18, 1978. Mungbean variety M7A was planted in this experiment. Main plots consisted of two fertilizer levels, with fertilizer and without fertilizer application. The fertilized mainplot received mixed fertilizer of 16-20-0 at the amount of 312.5 kg/ha applied as basal. Two methods of planting, broadcasting and drill planting were two subplots. Broadcasting was done on ploughed land followed by harrowing. Drill planting was done by drilling the seeds along the rows of 0.5 meter apart. In both methods equal seeding rate of 25 kg/ha was used. Applications of pre-emergence herbicide were considered as sub-sub-plots comprise of treatments receiving and not receiving herbicide. In the plot received herbicide, alachlor (Lasso 43.7% E.C.) at the rate of 2.15 kg (a.i.)/ha was applied immediately after planting. Main plot, sub plot and sub-sub plot covered the area of 160, 80 and 40 square meters, respectively. The sub-subplot in which mungbean was planted in row consisted of 10 rows of 8 meter long. Irrigation was not given in this experiment. Weed counting was done at 15 days after planting. All plots were harvested on July 20, 1978.

RESULTS AND DISCUSSION

Mungbean crop grown before rice during May-July, in Bangpae district was infested by weeds tremendously due to the ample amount of rainfall. Weed numbers per square meter counted at 15 days after planting was shown in Table 1, Table 2 and 3. The effects of pre-emergence herbicide at different methods of planting and at different level of fertilization were shown in Table 2 and 3, respectively. Neither fertilization not method of planting had an effect on number of weeds in this experiment. In contrary, application of pre-emergence herbicide reduced weed numbers after planting (P 0.01). Major weeds found were *Echinocloa colonum*, *Cleome viscosa*, and *Commelina bengalensis*.

Grain yield of mungbean was presented in Table 4, 5 and 6. Mungbean which was planted by drilling had higher mean yield compared to broadcasted mungbean (P 0.05). Drill planting gave higher yield than broadcasting whether the plot had received pre-emergence

Table 1 Weed numbers per square meter,at 15 days after planting, farmer's field, Bangpae, June 1978.

Weed species	With Fertilizer				Without Fertilizer			
	Row Planting		Broadcasting		Row Planting		Broadcasting	
	With Herbicide	Without Herbicide	With Herbicide	Without Herbicide	With Herbicide	Without Herbicide	With Herbicide	Without Herbicide
Echinochloa colonum	5	28	9	17	3	23	5	27
Commelina bengalensis	0	0	0	9	5	0	0	8
Cleome viscosa	20	23	7	9	10	16	2	2
Total	25	51	16	35	18	39	7	37

Compare two herbicide level-means at same fertilizer levels and method of planting $\frac{LSD_{.05}}{19}$ $\frac{LSD_{.01}}{28}$

C.V. (a) 30.9%
C.V. (b) 61.6%
C.V. (c) 34.4%

Table 2 Effect of pre-emergence herbicide on weeds number at 15 DAP[1] in mungbean field under drill planting and broadcasting.

	Number per square meter		
	With herbicide	Without herbicide	Difference
Drill planting	22	45	24**
Broadcasting	12	36	25**
Means	17	41	24**

[1]DAP : Day after planting	$LSD_{.05}$	$LSD_{.01}$
Compare two levels of herbicide	10	14
Compare two levels of herbicide at the same method of planting	14	20

Table 3 Effect of pre-emergence herbicide on weed number at

	Number per square meter		
	With herbicide	Without herbicide	Difference
With fertilizer	21	43	22**
Without fertilizer	13	38	25**
Means	17	41	24**

[1]DAP : Days after planting	$LSD_{.05}$	$LSD_{.01}$
Compare two levels of herbicide at the same level of fertilizer	14	20
Compare two levels of fertilization the same or different level of herbicide	18	35

Table 4 Grain yield of mungbean under different condition, farmer field Bangpae, June 1978.

	Yield (kg/ha)			
	With Fertilizer		Without Fertilizer	
	Drill planting	Broadcasting	Drill planting	Broadcasting
With herbicide	398.07	335.44	448.69	336.88
Without herbicide	329.32	261.07	426.00	321.25

C.V. (a) 34.0%
C.V. (b) 21.1%
C.V. (c) 18.3%

Table 5 Grain yield of mungbean under different method of planting and fertilizer level.

	Grain yield (kg/ha)		
	Drill planting	Broadcasting	Differance
With fertilizer	363.70	298.26	65.44^{NS}
Without fertilizer	437.35	329.07	108.08^{NS}
Mean	400.53	313.67	86.86^{*}
		$LSD_{.05}$	$LSD_{.01}$
Compare two methods of planting		61.25	101.56
Compare two methods of plantings at the same fertilizer level		122.32	202.88

Table 6 Grain yields of mungbean under two methods of planting, with two levels of herbicide application.

Method of planting	Grain yield (kg/ha)		
	Drill planting	Broadcasting	Difference
With herbicide	423.38	336.16	87.22^{*}
Without herbicide	377.66	291.16	86.50^{**}
Mean	400.52	313.66	86.86^{*}
		$LSD_{.05}$	$LSD_{.01}$
Compare methods of planting at same of different level of herbicide		74.81	192.84

herbicide or not (Table 6). Plot that was planted by drilling and received herbicide gave significantly higher yield than the plot that was planted by broadcasting and had not received pre-emergence herbicide.

Application of pre-emergence herbicide significantly increased mungbean yield under fertilized condition whereas in the unfertilized plot, the increase in yield by application of pre-emergence herbicide was not significant. The application of fertilizer tended to reduce mungbean yield probably due to the face that fertilizer stimulate weed growth which in turn compete with crop. This can be reasoned by the higher competition in the fertilized plot compared with plot receiving no fertilizer. Thus, application of fertilizer will not be advantageous to the crop if the weed growth was not suppressed by certain practices.

CONCLUSION

The experiment on Mungbean M7A in early rainy season Bangpae revealed that the application of pre-emergence

herbicide remarkedly reduced weed numbers. Neither planting methods nor fertilizer level affects the weed numbers.

Grain yield of mungbean in drill planted plot was significantly higher than in broadcasted plot. Application of pre-emergence herbicide increased mungbean yield only under fertilized condition. The application of fertilizer tended to reduce mungbean yield but the difference was not significant. This may attribute to the higher competition in fertilized plot.

The best yield in this experiment was obtained from plot that was planted in rows, using pre-emergence herbicide, and without fertilizer application. The low average yield in this experiment could be attributable to the effect of weed competitions in later stage of growth. In broadcasting, the great drawback of the practice is the difficulty to hand weed, therefore, herbicide application offer high potential in increasing mungbean yield. Under drill planting, herbicide may not be necessary if hand weeding is done once or twice before flowering.

LITERATURE CITE

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