

Effects of Mecoprop Wettable Powder Concentrations on Growth and Yield of Flax

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ABSTRACT

This study was conducted to evaluate the effect of mecoprop-wp concentrations on weed control, growth characters and yield in flax, after 7cm and 14cm of plant height it to the field. The major weeds were *Alopecurus aequalis* var. *a. murensis* (kom) ohwi, *Persicaria hydropiper* spach, *Lamium amplexicaule* L, *Stellaria alsine* Grimm var. *undulata* ohwi, *Eleusine indica*(L.) Gaertn. Flax yield were increased somewhat more with 250g/10a mecoprop-wp at 7cm of plant height than the other treatment and by hand weeding treatment of mecoprop- wp, 250g/10a at 7cm of plant height was slightly harmful for the flax with recommended concentration, On the other hand, all treatments were harmful in the double dosage level.

Keys words : Mecoprop - Wp, herbicides, flax, weed control

INTRODUCTION

The increase of crop productivity means the increase of production per unit area, which is achieved by the cultivation of high yielding varieties, the improvement of cultivation methods, and the prevention of damage from weed, but for the stability of productivity among these, the prevention of damage from weed is important (Kwon, 1968). Flax is soft slender and suitable to spinning for fine thread, and its strong tension and resistance against friction had better durability than those of cotton. In addition, although its moisture absorption is less than cotton, its evaporation is more rapid than cotton and fiber absorbing moisture is swollen and has increased tension and water-proofing. Seeds of flax contains 30-44% of fat and remnant from

seeds is used for linseed oil (Son, 1985; Kwon , 1987; Kwon *et al.*, 1988, 1989a, 1989b). Linseed oil is also used for medicine, print ink, paint and ball pen lead and remnants after pression oil are used for feeds or fertilizers (Son, 1985; Park *et al.*, 1987, 1989, 1990).

This study is to know proper amount of mecoprop-wp to increase the productivity of flax as economic utilization of idle paddy field and alternative effect of income according to the decrease of rice consumption and reports some findings of research (Kwon, 1968).

MATERIALS AND METHODS

This experiment was conducted at Jeonnam Rural Development Administration and Suncheon National University from March to June of 1968 and from March

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to June of 2001 and announced materials used Wiera.

Experiment of Application Period and Concentration of Flax Herbicide mecoprop-wp

Currently marketed herbicide, mecopro-wp, was applied to flax with plant height of 7cm and 14cm with 150g(l), 200g(l) and 250g(l) of herbicide in clean water of 90 l per 10a and then growth and yield of weeds were compared. Experiment plot was placed with 3-replicated split plot design, main plot was on application period (plant height of 7cm and 14cm), sub plot on application concentration of 150g, 200g, 250g/10a, test area per plot was 20m² and at the 15th of March that year, 800kg of compost and N-P₂O₅-K₂O=5-3-6 of fertilizers were applied at the plot of 1.2m width, 0.2m height and 0.3m intervals and then seeds of 9kg/10a were sown.

Examination of weeds was done once before harvest in June and after observing the growth of weeds within test plots and examining the whole area of 20m² per plot, it was changed into the quantity of weeds within 1 m².

Test of Harmful Effects of Herbicides by Application Period and Concentration of flax Herbicide mecoprop-wp

150g, 200g and 250g of mecoprop-wp per 10a were treated in 90 l of water with normal quantity, 300g, 400g and 500g of mecoprop-wp in clean water of 90 l were applied to soil and their harmful effects on growing flax were compared. Test plot was placed with 3 replications of completely randomized design and test area and cultivation methods per plot followed the above. Examination of their harmful effects within test plots was done by test plot after 10, 20 and 30 days of herbicide application.

RESULTS AND DISCUSSION

Test of Application Period and Concentration of Flax Herbicide mecoprop-wp

1. Effects of Prevention of Weeds by Application of Herbicide

When the early length of flax was 7cm and 14cm, effects of preventing the growth of weeds with application of 150g, 200g and 250g of herbicide per 10a to flax in 90 l of water were shown in Table 1.

There was no effect by rainfall after application of herbicides, the first types found were five and the number of individual weeds was smaller at all plots applying herbicides than at the plot using no herbicides with 12.0 and 24.2 plants, and in particular, it was smaller at plot of application of 250g per 10a. Dried weight of flax was less at all herbicide application plots compared to the plot using no herbicides (235g/m², 49.4g/m²) and in particular, yield of weeds at plot of 250g when early length was 7cm showed less yield of weeds as 2.8g/m², 4.3g/m². Therefore, prevention values of 250g of mecoprop-Wp per 10a when early length was 7cm were higher.

2. Difference of Yield of Weeds According to Quantity of Herbicide, mecoprop-wp

Yield of weeds after herbicide application was shown in Table 2 and 3. Yield of weeds was found as *Alopecurus aequalis* var. *a. murensis* (kom) ohwi > *Persicaria hydropiper* spach > *Eleusine indica*(L.) Gaertn > *Stellaria alsine* Grimm var. *undulata* ohwi > *Lamium amplexicaule* L. in order and *Lamium amplexicaule* L. and *Stellaria alsine* Grimm var. *undulata* ohwi showed good weeding effects, but all weeds except *Alopecurus aequalis* var. *a. murensis* (kom) ohwi showed great weeding effects when their early length was 7cm and at 250g/10a of quantity of herbicide. These weeding effects were the same as findings of research by Kwon (1968).

3. Difference of Weeding Values According to Kinds

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Table 1. Weed control effect of mecoprop-wettable powder concentration in flax field.

Mecoprop- Wp, 50%		Kind of weed	No. of weed	Dry wt. of	Weed control value(%)	
Spray time	Concentration (l /10a)		(plant/m ²)	weed (g/m ²)		
			Mean ± SD			
Plant height (7cm)	150	5	1.7 ± 0.2	3.6	84.7	
		5	2.5 ± 1.4	4.7	90.5	
	200	5	1.6 ± 0.3	3.3	85.9	
		5	2.4 ± 1.7	4.5	90.9	
	250	5	1.6 ± 0.8	2.8	88.1	
		5	2.3 ± 1.3	4.3	91.3	
	Plant height (14cm)	150	5	2.3 ± 0.9	5.1	78.3
			5	3.4 ± 2.1	8.5	82.8
200		5	1.6 ± 0.7	3.4	85.5	
		5	3.2 ± 1.9	7.8	84.2	
250		5	1.5 ± 0.7	3.0	87.2	
		5	3.0 ± 1.7	6.7	86.4	
No weeding			5	12.0 ± 4.5	23.5	0
			5	24.2 ± 5.3	49.4	0

Upper : 1968, 1st year of experiment.

Lower : 2001, 2nd year of experiment.

Table 2. Amount of weeds emerged in the flax field applied herbicides(1968).

Mecoprop- Wp, 50%		1)*	2)	3)	4)	5)	Total ± SD	
Spray time	Concentration(l /10a)							
Plant height (7cm)	150	1.3	0.3	0.0	0.0	0.1	1.7±0.5	
		2.7	0.7	0.0	0.0	0.2	3.6±1.2	
	200	0.2	0.3	0.0	0.0	0.1	1.6±0.4	
		2.5	0.6	0.0	0.0	0.2	3.3±1.1	
	250	1.6	0.0	0.0	0.0	0.0	1.6±0.6	
		2.8	0.0	0.0	0.0	0.0	2.8±0.8	
	Plant height (14cm)	150	1.4	0.2	0.0	0.0	0.7	2.3±0.7
			3.5	0.5	0.0	0.0	1.1	5.1±2.1
200		1.4	0.1	0.0	0.0	0.2	1.6±0.7	
		2.6	0.3	0.0	0.0	0.5	3.4±2.3	
250		1.3	0.1	0.0	0.0	0.1	1.5±0.4	
		2.5	0.3	0.0	0.0	0.2	3.0±1.7	
No weeding			3.1	2.8	1.5	2.1	2.5	12.0±2.1
			6.4	6.0	3.1	3.8	4.2	23.5±3.1

Upper : Number of weeds (plant/m²) Lower : Dry weight of weeds(g/m²)

1)* = *Alopecurus aequalis* var. *a. murensis* (kom) ohwi

2) = *Persicaria hydropiper* spach

3) = *Lamium amplexicaule* L.

4) = *Stellaria alsine* Grimm var. *undulata* ohwi

5) = *Eleusine indica*(L.) Gaertn.

Table 3. Amount of weeds emerged in the flax applied herbicides(2001).

Mecoprop- Wp, 50%		1)*	2)	3)	4)	5)	Total ± SD
Spray time	Concentration (l /10a)						
Plant height (7cm)	150	2.0	0.0	0.0	0.0	0.5	2.5±0.8
		3.6	0.0	0.0	0.0	1.1	4.7±1.7
	200	1.2	0.6	0.0	0.0	0.6	2.4±0.6
		2.3	1.1	0.0	0.0	1.1	4.5±1.5
	250	1.1	0.6	0.0	0.0	0.6	2.3±0.7
		2.0	1.1	0.0	0.0	0.8	3.8±1.3
Plant height (14cm)	150	2.4	0.5	0.0	0.0	0.5	3.4±1.2
		4.3	2.1	0.0	0.0	2.1	8.5±3.7
	200	1.6	0.8	0.0	0.0	0.8	3.2±1.1
		3.5	3.5	0.0	0.0	0.8	7.8±3.4
	250	1.8	0.6	0.0	0.0	0.6	3.0±0.9
		3.3	1.7	0.0	0.0	1.7	6.7±1.8
No weeding		11.5	5.8	4.3	2.1	3.5	27.2±3.7
		26.7	7.9	6.7	3.4	4.7	49.4±4.5

Table 4. Comparison of weed control for emerged in field applied different concentration of mecoprop-wp. 5%.

Mecoprop- Wp, 50%		1)*	2)	3)	4)	5)	Total ± SD
Spray time	Concentration (l /10a)						
Plant height (7cm)	150	57.8	88.3	100	100	95.2	88.3±4.8
		86.5	100	100	100	76.6	90.5±5.7
	200	60.9	88.3	100	100	95.2	88.9±5.2
		91.4	86.1	100	100	76.6	90.9±5.8
	250	56.3	100	100	100	100	91.3±5.9
		92.5	87.4	100	100	83.0	92.3±6.2
Plant height (14cm)	150	45.3	91.7	100	100	73.8	82.2±3.7
		83.4	73.4	100	100	55.3	82.8±3.6
	200	59.4	95.0	100	100	88.1	88.5±5.1
		86.9	55.7	100	100	83.0	84.2±4.7
	250	60.9	95.0	100	100	95.2	90.2±5.3
		87.7	78.5	100	100	63.8	86.4±5.1
No weeding	0	0	0	0	0	0	
	0	0	0	0	0	0	

Upper : 1968, 1st year of experiment.

1)*, 2), 3), 4), 5) same in Table 2.

Lower : 2001, 2nd year of experiment.

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Table 5. Comparison of growth characteristics and yield of flax treated with different concentration mecoprop-wp.

Mecoprop- Wp, 50%		Stem length	Plant/30cm	Yield (kg/10a)	
Spray time	Concentration(l /10a)	(cm)		Seed ± SD	Stem ± SD
Plant height (7cm)	150	62.5	25.3	75.0±2.7	256.5±8.5
		66.4	26.5	78.8±3.1	268.5±9.3
	200	60.3	24.2	74.8±2.5	248.9±7.2
		64.2	25.7	74.2±2.3	251.2±8.0
	250	53.6	23.8	72.8±2.1	241.6±6.8
		57.7	23.9	71.1±1.8	248.7±7.4
Plant height (14cm)	150	62.5	21.7	79.1±3.7	253.9±9.0
		68.8	23.4	72.4±2.5	256.5±8.8
	200	63.4	21.7	75.8±3.3	243.7±7.1
		61.1	22.7	70.4±1.5	247.7±7.5
	250	50.8	21.3	75.0±3.1	237.0±6.2
		51.9	21.5	68.8±2.5	231.5±5.7
No weeding		63.5	25.5	71.6±3.0	219.0±4.3
		68.1	27.0	66.5±2.4	215.7±4.0

Upper : 1968, 1st year of experiment.

Lower : 2001, 2nd year of experiment.

Table 6. Plant injury of flax of applied mecoprop - wp, 50%.

Mecoprop- Wp, 50%		Recommended Concentration			Double concentration (Harmful effect)		
Spray time	Concentration (l /10a)	10*	20	30	10	20	30
Plant height of 7cm	150	0	0	0	3	3	3
		0	0	0	3	3	3
	200	1	1	1	3	3	3
		1	1	1	3	3	3
	250	2	2	2	4	4	4
		2	2	2	4	4	6
Plant height of 14cm	150	3	3	3	6	6	6
		3	3	3	6	6	6
	200	3	3	3	6	6	6
		3	3	3	6	6	6
	250	5	5	5	6	6	6
		5	5	5	6	6	6
No weeding		0	0	0	0	0	0
		0	0	0	0	0	0

Plant injury : 0 (No injury) - 9 (Completely killed)

: Days after applied mecoprop-wp, 50%

Upper : 1968, 1st year of experiment.

Lower : 2001, 2nd year of experiment.

of Herbicides

As shown in Table 4, weeding values were higher at plot applying 150g, 200g and 250g of herbicide per 10a as over 90% when its early length was 7cm, but when its early length was 14cm, it was low at plots applying 150g, 200g and 250g per 10a as 82.8%, 84.2% and 86.4% respectively. In particular, when early length was 14cm, plot applying 250g of herbicide per 10a showed great prevention effects at *Persicaria hydropiper* spach, *Lamium amplexicaule* L., *Stellaria alsine* Grimm var. *undulata* ohwi and *Eleusine indica*(L.) Gaertn as 100%, but *Alopecurus aequalis* var. *a. murensis* (kom) ohwi showed lower prevention effects as 56.3%.

4. Difference in Growth and Yield of flax According to the Quantity of Application of mecoprop-wp

Influences of applying herbicides on growth and yield of flax were shown in Table 5.

Stem length showed little difference between plot using no herbicides with 63.5cm and plot applying herbicides, but plots using 250g of mecoprop-wp per 10a were lower as 53.6cm and 50.8cm respectively and those using mecoprop-wp of 150g and 200g were greater a little as 60.3cm and 63.cm respectively. The number of plants at 30cm intervals showed the same trend as stem length and there was no great difference between 25.5 plants at plot using no herbicides and plot applying herbicides, but plot applying mecoprop-wp of 250g per 10a harvested lower yield of 21.3-23.8 plants and plots applying mecoprop-wp of 150g and 200g per 10a harvested more plants of 21.7 -25.3.

In the yield of seeds per 10a, plots using no herbicides had 71.6kg and 66.5kg, but plots applying mecoprop-wp of 250g showed no decrease of yield as 71.1kg, 72.8kg, 68.8kg and 75.0kg respectively and plots applying mecoprop-wp of 150g and 200g also showed no decrease of yield as 70.4-78.8kg.

Yield of dried stem per 10a showed the same trend and that of plot using no herbicide showed 215.kg and

219.0kg respectively, but all plots applying herbicides showed no decrease of yield as 243.7-268.5kg and could inhibit the growth of weeds in early period of growth.

Experiment of Harmful Effects of Herbicides by Their Application Concentration in Sowing Flax

Examination of applying standard and double quantity of herbicides to flax on harmful effects of herbicides was shown in Table 6. Harmful effects of herbicides at plots using herbicides of 200g and 250g per 10a were recognized from the application of their standard quantity and there doubled use showed their harmful effects from the plot using 150g of herbicide and plots using herbicides of 200g and 250g showed withering to death. Therefore, yield of flax could be increased by decreasing the period of early competition between weeds and crop with herbicides and it was considered that herbicides of 250g per 10a showed higher weeding effects when the early length was 7cm and they were excellent herbicides, but changes of its remnants and valid components after using herbicides should be continuously examined.

Accordingly, it is thought that for prevention of weed of the flax, its yield can be increased by reducing the period of competition between weed and flax, the yield per 10a at the plot treated with contraction of 250B\$/10a of mecoprop Wp, 50%.

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