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THE EFFECTIVITY OF 150 g/L METAMIFOP HERBICIDE TO IDENTIFY AND CONTROL WEEDS IN PADDY FIELD CULTIVATION ROJOLELE VARIETY (*Oryza sativa* L)

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Abstract

Weeds are one of the obstacles to the growth of lowland rice cultivation which can reduce the quantity of rice yields so that weeds need to be controlled. This study aims to determine the effect of metamifop 150 g/L herbicide to control weeds in lowland rice cultivation. The experiment was carried out on paddy rice cultivation land in Langansari Village, Tarogong Kaler Cipanas District, Garut Regency, West Java, from November 2022 to February 2023. The experiment used a Randomized Block Design (RBD) with six treatments and four replications. The experiment consisted of four treatments with the active ingredient metamifop 150 g/L at a dose of A: 5.4 ml/12 m^2, B: 7.2 ml/12 m^2, C: 9.0 ml/12 m^2, D: 10.80 ml/12 m^2, E: manual weeding treatment and F : control treatment did not use herbicide. The results showed that the application of the herbicide with the active ingredient metamifop 150 g/L at a dose of D: 5.4 ml/12 m^2-10.80 ml/12 m^2 was effective in controlling total weed up to 6 weeks after application without causing phytotoxicity and yield productivityto paddy so application of metamifop herbicide able to suppress the growth of weeds Echinochloacrusgalli, Monochoria vaginalis, Cyperus rotundus, Spenochleazeylanica, Panicum repens, Cyperus difformis and total weeds.

Keywords: herbicides, metamifop, phytotoxicity, rice, weed

1. Introduction

Weeds are a type of plant that can reduce rice productivity with the presence of weeds in rice fields can cause competition for nutrients, water, light, CO2, and growing space. The level of competition between weeds and plants depends on environmental conditions, plant varieties, weed density, and plant age when weeds begin to compete (Sembodo, 2010). According to Madkar (2002) weeds in rice plants can lose 30 to 47% of yield. According to Antralina (2012) common weeds in paddy fields are *Echinocloa cruss-galli*, *Fimbristylis miliaceae*, *Sphenochlea zaylenica*, *Cyperus difformis*, *Leersia hexandra* and *Limnocharis flava*. The dominant weeds in a rice field are *Ludwigia octovalis*, *Monochoria vaginalis*, *Marsilea crenata* and *Cyperus iria*.

Weed control can take the form of prevention and eradication. Weeding is the most common method used by farmers to control weeds.

2. Materials and Methods

Research Methods

The method used in this research is an experimental method using a non-factorial randomized complete block design (RBD) with 6 treatments and 4 replications.

Research Time and Place

The experiment was conducted in Langansari Village, Tarogong Kaler Cipanas District, Garut Regency, West Java from November 2022 to February 2023. The location of the experimental site has an altitude of approximately 600 m above sea level (masl).

Population and Samples

The population used is the entire total rice plots in the field. The samples used were Metamifop 150 g/l with 6 different treatments at 4 repetitions of concentrations of 5.4 ml, 7.2 ml, 9.0 ml, 10.80 ml.

Observation Techniques

Observations made consisted of observations of weeds with the Sum Dominance Ratio (SDR) method, namely by taking weed samples before application at the age of 3 and 6 WAH. As for data processing, it is done with prerequisite tests and hypothesis tests if the treatment shows significantly different then further tests are carried out, namely Duncan.

Tools and Materials

The tools used in this study include oven, ruler, notebook, analytical scales, semi-automatic back sprayer, measuring cup, pipette. The materials used were Metamifop 150 g/L herbicide, urea fertiliser, TSP, KCL, water.

3. Results and Discussion

This study was conducted to determine the effect of using Metamifop 150 g/L herbicide on the growth of rojolele rice paddy varieties in Langensari Village, Tarogong Kaler District. This research was conducted by giving treatments with different doses, namely giving doses of A: 5.4 ml, B: 7.2 ml, C: 9.0 ml, D: 10.80 ml, E: manual weeding treatment and F: control treatment with no weed control. Parameters observed in this study included weed biomass (grams) phytoxicity (%), plant height (cm), number of tillers (number) and yield (grams) of rojolele variety rice paddy.

Table 1.Weed Dry Weight (g/0,5 m^2)

Treatment	Dose (ml/ 12 m^2)	Observation	
		3 WAH	6 WAH
Metamifop 150 g/L	5,4	21,69 a	31,23 a
Metamifop 150 g/L	7,2	18,76 a	24,60 a
Metamifop 150 g/L	9,0	20,46 a	20,53 a
Metamifop 150 g/L	10,80	15,26 a	19,30 a
Manual Weeding	-	24,76 a	29,81 a
Control (no weed control)	-	55,22 b	69,23 b

Description:Mean values marked with the same letter in the same column indicate not significantly different at the 5% level according to Duncan's Test. WAH = Week After Herbicide Application.

From Table 1, it can be seen that there is an effect of herbicide application made from the active ingredient Metamifop 150 g/L on total weed control in rice cultivation fields. The average dry weight of weeds showed the lowest in the herbicide treatment dose of 10.80 ml at 3 WAH and 6 WAH. The dose of 10.80 ml was not significantly different from the other dose treatments and manual weeding but significantly different from the control treatment.

Phytotoxicity of Rice Crops

Table 2.Observations of rice crop toxicity at 1 Week After Haerbicide Application, 2 WAH and 3 WAH

	Treatment	Dose	Observation		
		(ml/12 m2)	1 WAH	2 WAH	3 WAH
A.	Metamifop 150 g/L	5,4	0	0	0
B.	Metamifop 150 g/L	7,2	0	0	0
C.	Metamifop 150 g/L	9,0	0	0	0
D.	Metamifop 150 g/L	10,80	0	0	0

Description:Observation Results

This means that the use of herbicides made from the active ingredient Metamifop 150 g/L does not interfere with the growth of rice plants because, Metamifop 150 g/L herbicide, is a type of pre-emergent, post-emergent and selective herbicide and is systemic. This is in accordance with the statement of Richard (2021) which states that the use of metamifop herbicide does not have a phytotoxicity impact. This is also in accordance with the statement of Aprilia *et.al*., (2022) which states that the use of metamifop herbicide does not have a toxic impact on rice crops.

Rice Crop Height

Table 3.Rice Crop Height (cm)

Treatment	Dose (ml/12 m^2)	Observation	
		3 WAH	6 WAH
Metamifop 150 g/L	5,4	57,35 bc	73,73 b
Metamifop 150 g/L	7,2	56,15 bc	71,60 b
Metamifop 150 g/L	9,0	60,03 c	70,83 b
Metamifop 150 g/L	10,80	60,25 c	73,45 b
Manual Weeding	-	53,43 b	77,80 b
Control (no weed control)	-	47,85 a	51,48 a

Description:Mean values marked with the same letter in the same column indicate not significantly different at the 5% level according to Duncan's Test. WAH = Week After Herbicide Application.

Based on the data in Table 3, the height of rice crops, it can be seen that the herbicide treatment doses of 5.4 ml, 7.2 ml, 9.0 ml and 10.80 ml were significantly different from the control treatment at 3 WAH and 6 WAH. The dose of 5.4 ml was not significantly different from the manual weeding treatment at 3 WAH and 6 WAH. This shows that the 5.4 ml dose treatment is still effective and influences the growth of rice plant height even though the 5.4 ml dose is included in the lowest dose.

Number of Vegetative Tiller of Rice Crops

Table 4.Number of Rice Vegetative Tiller Per Clump

Treatment	Dose (ml/12 m^2)	Observation	
		3 WAH	6 WAH
Metamifop 150 g/L	5,4	17,28 b	20,90 bc
Metamifop 150 g/L	7,2	17,65 b	20,10 bc
Metamifop 150 g/L	9,0	18,00 b	19,45 b
Metamifop 150 g/L	10,80	18,88 b	22,13 bc
Manual Weeding	-	18,48 b	23,23 c
Control (no weed control)	-	13,55 a	16,00 a

Description:Mean values marked with the same letter in the same column indicate not significantly different at the 5% level according to Duncan's Test. WAH = Week After Herbicide Application.

The observation of the number of rice tillers per clump at 3 WAH showed that the control treatment was significantly different from the other treatments. At the observation of 6 WAH the number of tillers produced by the control was the least and significantly different from the other treatments. This shows that herbicide control has an effect on the number of vegetative tillers of rice, in contrast to the case without herbicide control/control treatment has no effect on the number of vegetative tillers of rice which causes the growth of the number of rice tillers to be small.

Rice Harvest Yield

Table 5. Rice Harvest Yield (2,5 m x 2,5 m)

Treatment	Dose (ml/12 m^2)	Dry Milled Grain Yield (g/6,25 m^2)
Metamifop 150 g/L	5,4	2893,25 b
Metamifop 150 g/L	7,2	3073,05 b
Metamifop 150 g/L	9,0	3147,90 b
Metamifop 150 g/L	10,80	3185,63 b
Manual Weeding	-	3132,95 b
Control (no weed control)	-	2642,08 a

Description:Mean values marked with the same letter in the same column indicate not significantly different at the 5% level according to Duncan's Test. WAH = Week After Herbicide Application.

Analysis of the average rice yield is presented in Table 5, it can be seen that the average results of the 150 g/L Metamifop herbicide treatment from 5.4 ml to 10.80 ml gave rice yields that were not significantly different from the manual weeding treatment and significantly different from the control treatment. This shows that the 150 g/L Metamifop herbicide treatment gives equivalent results to the manual weeding treatment. In addition, it can be seen that the rice yield from the lowest dose treatment of 5.4 ml gave results that were not significantly different from other doses.

4. Conclusions

Based on the results of the research that has been carried out, it can be concluded as follows:

1. Herbicide made from Metamifop 150 g/L was able to suppress the growth of *Ludwigia octovalis*, *Monochoria vaginalis*, *Spenochlea zeylanica*, *Panicum repens*, *Cyperus difformis*, *Cyperus rotundus*, *Echinochloa crusgalli*, *Fimbristylis miliacea* and total weeds. Herbicide made from Metamifop 150 g/L had an effect on rice plant height, number of vegetative tillers and rice yield.
2. Herbicide made fromMetamifop 150 g/L at 5.4 ml/12 m^2-10.80 ml/12 m^2 was effective in controlling total weed up to 6 weeks after application without causing phytotoxicity and yield productivityto paddy

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