

WEEDING ON SAGO PLANTATION AT PT. NATIONAL TIMBER AND FOREST PRODUCT, TEBING TINGGI ISLAND, MERANTI, RIAU, INDONESIA

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ABSTRACT

Weed is one problem in the cultivation of sago palm, especially on deep peat soil. Weed can growth and develop faster in humid mineral soil. Weeding is very important in the early growth stage to reduce competition for nutrients, water, sunlight, and space. After weeding, sago palm maintenance could be done more easily. This experiment has been conducted at PT. National Timber and Forest Product. Although weeding was very interesting, from 2004-2008 weeding was not done. At the beginning of 2009, the weeding has been restarted. The treatments consisted of many kind herbicides and dosages. The treatments were glyphosate (liquid), and metsulfuron (granular) herbicides. Dosages of herbicides were 1.5 l, 3 l, 37.5 g, 75 g, per ha dosages. Combination herbicides were (glifosat 3 l/ha, metsulfuron 75 g/ha, glifosat 1.5 l/ha + metsulfuron 37.5 g/ha, combined with manual weeding), only manual weeding, control (without weeding), and (glifosat 3 l/ha, metsulfuron 75 g/ha, glifosat 1.5 l/ha + metsulfuron 37.5 g/ha without manual weeding in the beginning). The results indicated that dominant weed were *Neprolephis bisserata* Schott., *Stenoclaena palustris* (Burm.) Bedd, *Mikania micrantha* H. K. B., *Boreria* sp., *Melastoma malabatricum*, *Glichenia* sp.. Manual weeding combined with glyphosate 1.5 l/ha and metsulfuron 37.5 g/ha was not significantly different with manual weeding only. It could be seen in the SDR (Summed Dominated Ration), dry weight and height of weeds. The effect of weeding treatments on sago palm growth was not significantly different.

Key words: weeding, herbicide, growth, sago palm

INTRODUCTION

Indonesia has big potential resources and sago palm is one of them. Sago starch is commonly used for certain purposes such as raw material for food industry, snack, and sago pith residue can be used animal feed, crop's media (Bintoro, 2000).

Indonesia, located on the tropic climate, has land for sago planting at about 21 million hectare. Areas of sago plantation that only grow and even develop naturally are about 1,2 million hectare (Flach, 1977). From the areas, it is about 8-13 million dry starch per year. Sago palm growth and development can be faster if weed obstruction is not found.

Sago palm usually grows in the river bank, humid, or swampy area. The humid area is not only very good for sago plant, but also weed. Aldrich (1988) reported that weeds are considered to primarily compete with crop for soil nutrients, soil moisture, light, and carbon dioxide.

Weeds compete at early growth stage of sago palm. If weeds grow were dominate, sago palm growth can be suppressed, trunk formation and harvesting can be

more time. It not only reduced crop production, but also increased the cost production. Combination manual and chemical weeding experiment need to be established. Roshid (2007) reported that utilization two herbicides were more effective to suppress the weed compare with only one herbicide application.

MATERIALS AND METHODS

Materials

Herbicides may be applied in a number of different ways to reduce weeds and crop competition. Herbicides treatment consists of metsulfuron and glyphosate. Glyphosate is a non selective broad-spectrum herbicide. They control the annual, biennial, and perennial herbaceous species of grasses, sedges, and broadleaf weeds. Metsulfuron is used for brush and broadleaf weeds control. The label suggested that the herbicides should be mixed with other herbicide to control broaden spectrum of weeds.

Methods

A total of 8 herbicide treatments were used to control weeds. The herbicides were :

- P0 = control
- P1 = manual,
- P2 = glyphosate 3 l/ha,
- P3 = metsulfuron 70 g/ha,
- P4 = mixes glyphosate 1.5 l/ha + metsulfuron 37.5g/ha,
- P5 = manual+ glyphosate 3 l/ha
- P6 = manual+metsulfuron 70 g/ha
- P7 = manual + glyphosate 1.5 + metsulfuron 37.5 l/ha

Treatments herbicides P5, P6, P7 were applied 20 days after manual weeding.

Cultivation technique change

Weeding is important the early growth stages of sago palm to reduce competition for sunlight, space, and nutrients. Before 2009, PT. National Timber and Forest Product still used row weeding (Jong, 2000). Weeds were cut as long as row. It is carried out 2 to 3 times a year as row weeding. That activity need less worker. Row weeding is to be considered more safety for sago growth.

Alternatively, clean weeding is long space between two rows of sago clump (Figure 1.). It is considered as more effective in sago palm cultivation than row weeding, because the weeds were more be suppressed and effective for harvesting transportation.

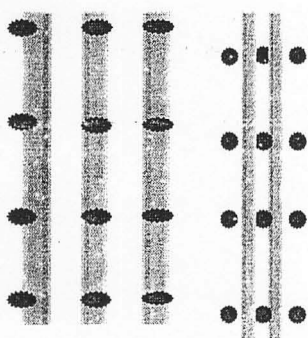


Figure 1. Row and Clean Row Weeding

RESULTS

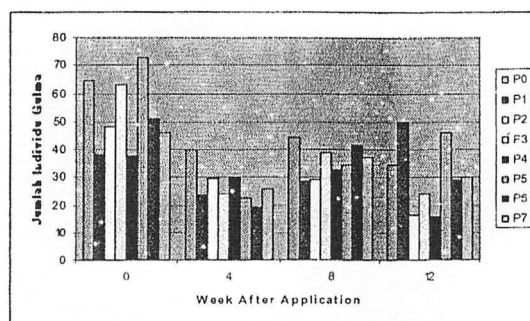
Manual and herbicide weeding treatments suppressed growth and development weeds at 8 WAA (Week after applications) as shown in Table 1. Combination manual + chemical and manual weeding only treatments were

not significantly different. Control and chemical weeding only were not significantly different too.

Table 1. Weeding Influence toward Dry Weight Weeds Total

Treatments	Dosage s (g/ ha)	Week After Application		
		4	8	12
Control		12 a	80 a	69a
Manual		3b	4d	11b
Glyphosate 48%	3 l	11 a	45 bc	57 ab
Metsulfuron 20 %	75	96 a	64 ab	36 ab
Glyphosate 48%+ Metsulfuron 20%	1.5 l +37.5	89 a	35 c	25 ab
Manual+Glyphosa te 48%	3 l	6b	5d	21b
Manual+Metsulfu ron 20%	75	9b	9d	12b
Manual+Glifosat 48% +	1.5 l +37.5	13 b	7 d	12 b
Metsulfuron 20%				

Figure 2. Amount individual of weed before and after treatments



Although weed treatments suppressed weeds until 8 WAA, but the weeds will recovery grow at 12 WAA (Table 2.).

Table 2. Influence Weeding toward weeds HighGulma *N. biserrata* Schott.

Acitivities	Dosis (g/ ha)	Minggu Setelah Aplikasi		
		4	8	12
Control		78a	77a	61ab
Manual		25c	27b	26d
Glifosat 48%	3 l	65ab	62a	26a
Metsulfuron 20 %	75 g	80a	59a	49a-d
Glifosat 48%+ Metsulfuron 20%	1.5 l + 37.5	74a	56a	53a-c
Tebas+Glifosat 48 %	3 l	26c	26b	40b-c
Tebas+Metsulfur on 20%	75 g	28c	24b	36cd
Tebas +Glifosat 48% +	31.5 l + 37.5	35bc	32b	38b-d

Manual and chemical treatments inclined number of individual weed is inclined at 8 WAA, but the effect of chemical treatments still suppressed until 12 WAA.

DISCUSSION

Summed Dominant Ration before application are *N. biserrata* (76.82%), *S. palustris* (6.29%), and *M. micrantha* (9.61%). SDR after application are *N. biserrata* (88.96 %), *S. palustris* (1.88 %), and *M. micrantha* (4.20 %). Shift in weed competition a consequence of differential Effectiveness of herbicides have led to the now common practice of combining two or more herbicides. There are factors affecting effective-ness of herbicide.

Leaf characteristic on *N. biserrata* may influence the leaf as a point of entry of a herbicides. One of that are leaf hairs. Such structures clearly can affect the degree of contact between a herbicidal spray and the cuticle.

A thick stand of epidermal hairs could prevent contact between the herbicides and cuticle. There is also some evidence that individual hair may serve as appoint of entry for herbicides. Because species differ in the presence and amount of epidermal hairs, these structure may therefore be the source for some different in effect of herbicide on plants.

The clay and organic matter in the soil effectively hold volatile herbicides, similar to condition in solution. Soil pH on acidic peat soil also affects the persistence.

CONCLUSIONS

Clean weeding is more effective in weed suppressing, easily for harvesting. Combination manual and chemical weeding were not significantly different with manual weeding only. It is possible that very acid water (pH 3.1-4.0) and high total soluble suspended in the water that used for herbicide application caused herbicide treatment ineffective.

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