

# CHAPTER 1

## INTRODUCTION

### 1.1. Background

Rice (*Oryza sativa* L.) is one of the most important sources of world's food supply as well as in Indonesia which is the world's third-largest rice producer and also one of the world's biggest rice consumers. Annual per capita rice consumption of Indonesia in 2009 is 127.4 kg/year. Indonesia is the world's fourth most populous country with almost 240 million people in 2010 (IRIR's Rice Almanac, 2013). The rice area in Indonesia expanded from 11.4 million ha in 1995 to 13.2 million ha in 2010, which represented 24% of the total agricultural area. Rice yield increased slightly from 4.3 tons/ha in 1995 to 5 tons/ha in 2010. International Rice Research Institute (IRRI) estimates that Indonesia will require 38% more rice in 25 years, which means that the average rice yield must increase to more than 6 tons/ha to fill the gap. To avoid huge imports, most rice policies in Indonesia have been aimed at achieving rice self-sufficiency by increasing production. However, rice cultivation has to face various problems that can decrease its production and weed is one of the most serious pests in rice field.

Weed is one of the four most important groups of pests on rice, along with insects, diseases and rat. Weeds compete directly with crops in the field by using sunlight, nutrition, and water...affect to growth, development, quality and productivity of crops. Damage caused by weed in rice field is enormous, according to statistics from rice-growing countries in the world, weed can reduce yield up to 60%. A judicious weed management can raise 20-75% of yield (Nguyen HuuTruc, 2012).

As Rice Knowledge Bank, direct control of weed can be done through manual weeding by hand and mechanical weeding using implement. Manual weeding by hand is an efficient method for weed control. However, this is labor intensive and is not practical for large areas. Mechanical weeding is most appropriate for crops transplanted in straight rows. This method requires less time and labor cost than manual weeding. Mechanical weeding may be less effective than hand weeding because weeds within the

crop rows are not removed. Competition of rice crops from weed that survive can be harmful.

Practice using herbicides on rice field is taken place because their ability to control weeds without interfering the other kinds of crops, especially main crop. When compared with manual control, using herbicides is a cheaper method. Moreover, weed control is simplified when selectivity of herbicides can be increased (Tu et al, 2001).

The success of weed control is determined by selection of herbicide and application time. The property of herbicide which kill weed is the combination of toxicity and persistency. The persistency of herbicide can help effect on weed control last for long period (Adam et al, 2008).

According to Nguyen HuuTruc (2012), Japan paid 530 million dollars for herbicide on rice and average is about 265 dollars per hectare, in 1991. The cost of weed control is dramatically lower when using herbicide. In Vietnam, from 1990–2003, the percentage of herbicides in total pesticides has increased about 10-fold to 30.2% (Khanh et al, 2006). The cost for herbicide is only between 2.3% up to 3.2% of the whole revenue or income. The herbicide's cost is around 15.2% from the total input costs including other pesticides and fertilizers (Tuat et al, 1997).

*Fimbristylismiliacea* is a dominant sedge weed in rice, especially in Southeast Asia. It is a serious and widespread weed of rice. This is annual or perennial weed, which can be an alternate host of diseases and insects. Uncontrolled *Fimbristylismiliacea* alone reduces grain yield by 42% (Begum, 2006).

Response to some types of weeds to herbicides is dependent on the type of herbicides used, which are classified into selective or non-selective herbicide (Jamilah, 2013). DuPont support the successful weed control program through Ally Plus® products, pre-emergence herbicide and full grown with three active ingredients metsulfuron methyl, ethyl chlorimuron, and 2.4 D sodium from the class of sulfonyl urea. With the use of a dose of 480-640 grams per hectare and the application time at the age of 7-10 days after planting effective for controlling weeds of rice so that rice weed free, more tillers produce.

The study on the “Effect of herbicide (2,4 D Sodium 75% + Metsulfuron methyl 0.7% + Ethyl chlorimuron 0.7%) for the control of *Fimbristylismiliacea* in rice field (*Oryzasativa* L.)” has been conducted to find the alternative method for controlling *Fimbristylismiliacea* in rice field.

## 1.2.Objective

The specific objective of this study is to obtain a standard method of weed control on rice plants, start from the period of nursery to the field with various dosages of herbicide Ally Plus 77 WP, in order to increase the production of rice plants.

