

Weed Control Practices of Organic Farmers in Malaysia

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ABSTRACT

Organic farming is a form of agriculture which excludes the use of synthetic fertilizers, pesticides and livestock feed additives. It is also known as biological farming, regenerative farming and sustainable farming. A total of 18 certified organic farmers registered under Department of Agriculture were interviewed regarding organic practices. The objective of this study is to identify the common weed control practices carried by these organic farmers. The results indicated that the common weeds in organic farms were narrow leaf and they were controlled by using mulching, grass cutting and manual weeding. In the harvesting of crops, handpicking is the most common technique used. The results obtained in this study can be useful information as a baseline data in order to help and encourage conventional farmers to join organic farming in the future.

Keywords: organic, certified, mulching

Introduction

In Malaysia, agriculture has undergone various changes since 1950s. Agriculture in Malaysia was mainly practiced by means of traditional techniques in accordance to nature and environment. However, introduction of new technologies and government policy such as the use of chemicals and pesticides in order to boost the profit and productivity has also caused long term negative effects to the ecology, health, social and economy in Malaysia in the most recent decades (Hock, 1999; Faridah, 2001). Due to that, organic farming was introduced recently and had acted as a catalyst in triggering the organic agricultural systems across the world (Ghimire, 2002). Organic farming is described as farming with the nature. This refers to the use of only natural inputs and also farming in a way that is compatible with or even enhances the biodiversity and self-renewing characteristics of the environment in the farm itself. Organic farming does not use conventional chemicals to control pests, diseases and weeds and the main emphasis is on cultural and management control techniques that help to control the outbreak. Such practices in organic farming involve the soil fertility management, pest and disease management as well as weed management (Marshall, 2002). Organic farming has developed rapidly in the past and is seen as a sustainable alternative to chemical-based agricultural systems that contributed toward healthier agriculture for well-being of human as well as environment and biodiversity of its nature (Escobar & Hue, 2007). Organic farming is an agricultural system that eliminates the use of synthetic product such as pesticides, fertilizers, growth regulators and livestock feed additives (Ronald, 2006). In addition, organic farming is a holistic production management system that enhances and promotes agro-ecosystem health, including biodiversity, soil biological activities and biological cycle. Furthermore, it is intended to produce high quality, nutritious food that contributes to health care and well-being of human being (Houre, 2008).

Weed management can be defined as a technique in reducing weeds for optimum growth of the crops. There are many techniques used to reduce infestation of weed in farm such as intercropping, crop establishment, fallowing and mulching. Intercropping is defined as cropping two or more crops species in the same field. The benefit of this practice is that the crops cover a large area of cropping and leave less area available for emergence of weeds. This intercropping can be done by only using cash crops or a mixture of cash crops with fertility-building crops. These techniques are done in many ways such as under-sown crops, strips crops or row

intercrops. This practice can improve the growth of crops and increase yield (Davies & Lennartsson, 2005). In another interpretation, it is done by using alternating rows or a number of rows of compatible field crops, such as chilli and corn and is applicable to multiple crops. The interplanting done in small scale, on the other hand, is often called companion planting (Kuepper & Gegner, 2004). Based on a study on evaluation of mulching, intercropping with *Sesbania* and herbicide use for weed management in dry-seeded rice carried out by Singh et al., (2007), application of wheat residue mulch of 4 tonnes per hectare and *Sesbania* intercropping for 30 days were equally effective in controlling weed associated with dry-seeded rice.

Other practice that is suitable for weed management in organic farming is through crop establishment. The ability of the crops to get off to a good start ahead of the weed is critical. This can be aided by the use of primed seeds or by transplanting already established plants into a freshly prepared weed-free seedbed. This helps to boost the growth of the crops. This practice is also an example that helps organic farming to have optimum output (Davies & Lennartsson, 2005). Another aspect of biological control of weeds is the direct use of natural enemies to reduce weed populations. They are usually plant pathogens or may be insects or tadpoles. Duck have also been used for weed control in Japan, while grass carp fish are used to control weeds in Indonesia. Apple snails are used for controlling weeds in Taiwan (Ghimire, 2002). Mulching is a practice often used by organic farmers. Traditionally, it entails the spreading of large amounts of organic materials such as straw, old hay and wood chips (Kuepper & Gegner, 2004). Mulching is an important practice in organic farming that helps to protect the soil surface, improve the biological activity within soils and as a method of weed control. Growing plants are also used as living mulch. This involves the use of low growing, non-competitive plants as a soil cover under the growing crop legumes or flowering plants that will encourage predacious insects into the crop environment are often chosen. Alley cropping is also adaptable to organic farming (Marshall, 2002; Kuepper & Gegner, 2004). Fallowing is a practice that helps in controlling weeds. It is done by stopping cropping for certain period of time in order to control weed infestations. The land are ploughed and let to rest in order to kill or destroy weed seeds as well as seedlings. This practice is useful to control weeds interrelated with improving output in organic farm (Davies & Lennartsson, 2005).

Materials and Methods

Close ended questions and open ended questions were included in the questionnaire (Jackson, 2009). The questionnaire was designed in the form of structured approach which consists of multichotomous questions. The respondents were asked to choose the alternatives that most closely correspond to their position on the subject matters. Some of the questions were in the form of dichotomous questions where the farmers had only two fixed alternative answers to choose, for example yes or no as the answers.

Results and Discussion

Major of weeds commonly faced by organic farmers all over Malaysia were in the category of narrow leaf (89%). *Eluesine indica* (rumpit sambau) was the most common narrow weed faced by the farmers and followed by *Paspalum conjugatum* (rumpit kerbau) and *Imperata cylindrical* (lalang). On the other hand, broad leaf weeds commonly found in organic farms were *Amaranthus spinosus*, *Mikania micrantha*, *Croton hirtus*, and *Boreria latifolia* (Table 1). Based on farmers' feedback, narrow leaf weeds were the most difficult weeds to be controlled because these weeds have vegetative rooting system that enable the weeds to survive even after being cut off. The only way to control such weeds is by uprooting the weeds. It is expensive to practice and it is also laborious.

Most farms were affected by 4 to 9 types of weeds (Figure 1). For controlling weeds in organic farms, farmers usually applied mulch to cover the exposed land (Table 2). Two common mulches used in organic farm were straw and plastic mulching. Singh et al. (2007) reported that an amount of 4 tonnes per hectare of mulching was effective in controlling weeds in organic farm.

The second common technique used by the farmers in controlling weeds was crop rotation. Adjusting time of planting was again not realized as a positive means in controlling weeds. For combination of cultural

techniques for controlling weeds, 33.3% of the farmers used a combination of two techniques whereby only 27.8% of the farmers used one technique in controlling the problem. There were 2 farmers who did not practice any cultural control technique in controlling the weeds (Figure 2).

Manual weeding and grass cutting were practiced by most farmers (83.3%) in controlling weeds (Table 3). Some other 33% farmers practiced removed and burned as well as practiced forking in weed control. None of the farmers used burying technique. Biological control of weeds was rare in Peninsular Malaysia. Only one farmer used fish to control weeds in brown rice field. Half of the farmers interviewed used combination of two physical techniques of controlling weeds. There were two farmers who did not use any of these physical techniques in controlling weeds (Figure 3).

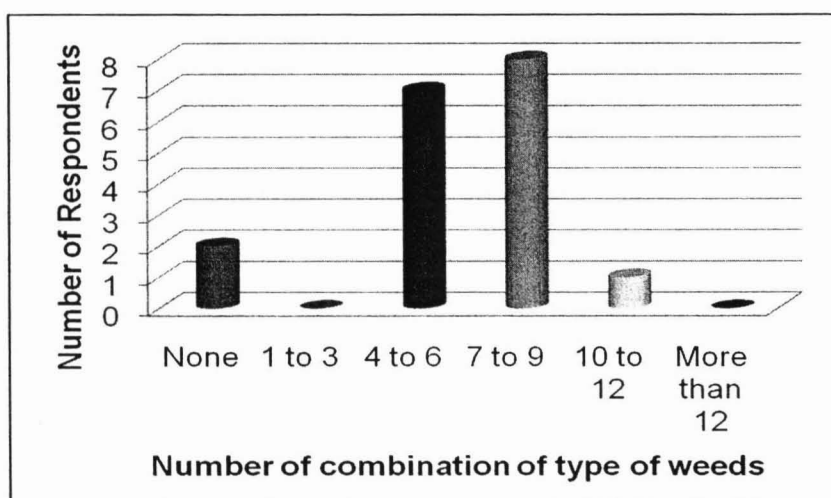


Figure 1: Combination of type of weeds in respondent farms

Table 1: Common weeds in Malaysia

No.	Type of weed	Number of respondents (n)	Frequency (%) *
1	Rumput sambau	16	89
2	Rumput bunga putih	13	72
3	Rumput kerbau	15	83
4	Rumput pahit	8	44
5	Rumput gajah	1	6
6	Lalang	15	83
7	Nutgrass	6	33
8	<i>Amaranthus spinosus</i>	8	44
9	<i>Mikania micrantha</i>	4	22
10	<i>Croton hirtus</i>	7	39
11	<i>Boreria latifolia</i>	1	6
12	<i>Cyperus kyllinga</i>	7	39
13	<i>Cyperus rotidosperma</i>	6	33
14	<i>Cyperus javanicus</i>	1	6
15	Others	2	11

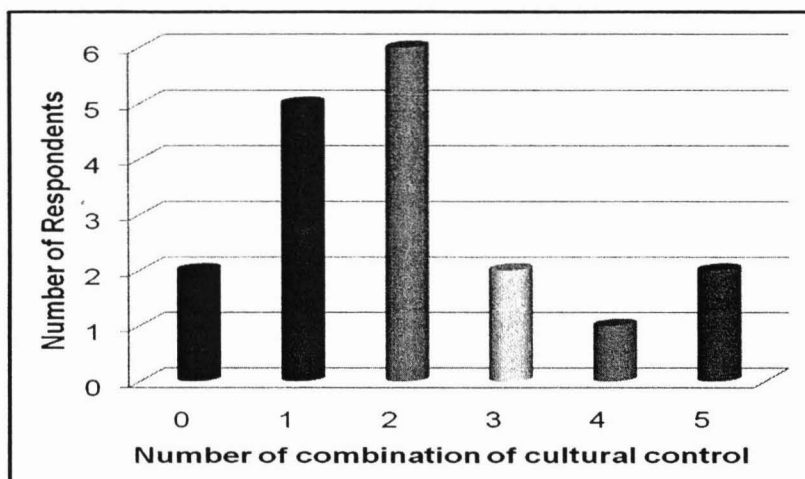


Figure 2: Combination cultural controlling technique

Table 2: Cultural controlling technique to reduce weeds infestation

No.	Cultural control technique	Number of respondents (n)	Frequency (%) *
1	Intercropping	5	28
2	Crop establishment	1	6
3	Companion planting	2	11
4	Time of planting	0	0
5	Crop rotation	7	39
6	Mixed cropping	3	17
7	Mulching	13	72
8	Ground Cover	5	28
9	Others	1	6

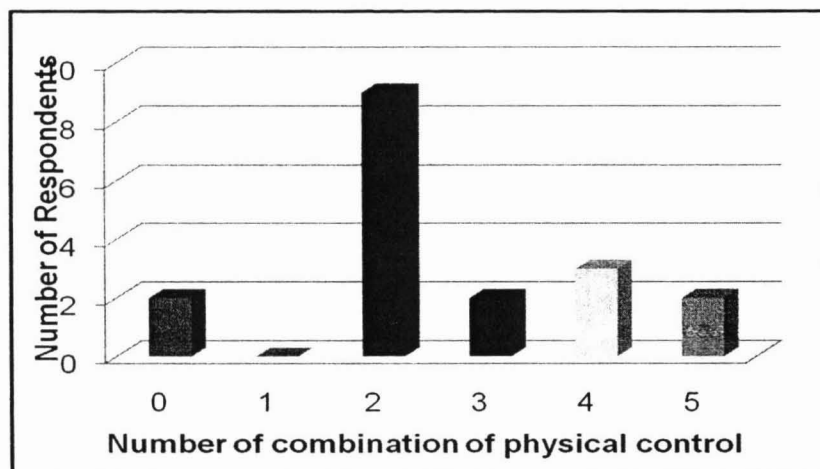


Figure 3: Combination physical controlling technique

Table 3: Physical controlling technique in reducing weeds

No.	Physical control technique	Number of respondents (n)	Frequency (%) *
1	Forking	6	33
2	Digging	3	17
3	Burying	0	0
4	Remove and burning	6	33
5	Manual weeding	15	83
6	Grass cutting	15	83
7	Others	1	6

Conclusion

Grasses commonly found in organic farms were *Eluesine indica* (rumpit sambau), *Paspalum conjugatum* (rumpit kerbau) and *Imperata cylindrical* (lalang). Mulching, grass cutting and manual weeding were used to suppress the growth of weeds.

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