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Weed Management In Organic Farming

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ABSTRACT

Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. Organic farming" is defined as production system which avoids or largely excludes the use of synthetically compounded fertilizer, pesticides, growth regulators and livestock feed additives. The green revolution technologies involving indiscriminate use of synthetic agrochemicals such as fertilizers and pesticides with adoption of nutrient responsive high yielding varieties of crop have boosted the production.

Keywords: Organic Farming, Weed Management, Human Health.

Introduction

Weeds constitute a special class of pests which seriously limit the production of the crops on any scale. They compete with the crops for nutrients, air, light and moisture and play major roles in crop yield loses (Ofor *et al*., 2009; Kumar *et al*.,2013; Das *et al*., 2016). In a review of crop yield losses due to pests, it was reported that: 'overall, weeds caused the highest loss (34%) with animal pests and plant pathogens being less important causing losses of 18% and 16%, respectively. weeds are those plants that negatively affect crop production. First and foremost, weeds compete with crops for resources, such as light, nutrients, and water, and potentially reduce crop yields. Weed management should, however, reduce competition from current and future weeds by preventing the production of weed seeds and perennial propagules - the parts of a plant that can produce a new plant. Consistent weed management can reduce the costs of weed control and contribute to an economical crop production system.

Methods of Weed Management:

1. Cultural Practices
2. Mechanical weed control
3. Biological weed management
4. Approved herbicides

1. Cultural Practices

A. Crop Rotation

Organic farmers often use mixed cropping systems and long rotations to

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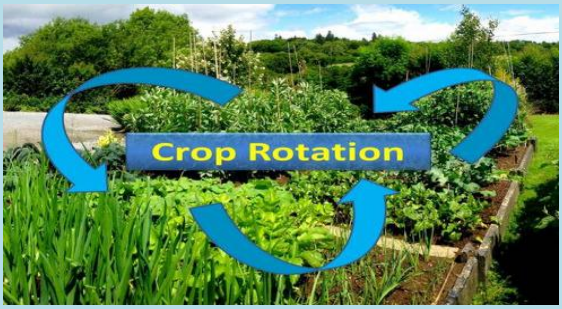
enhance soil fertility and economic diversity. Crop rotation also can be a cornerstone in a weed management plan. Crop rotation involves alternating different crops in a systematic sequence on the same land.



Crop Rotation

B. Cover Crops

Rapid development and dense ground covering by the crop suppress weeds. The inclusion of cover crops such as ricebean, groundnut, rye, red clover, buckwheat, wintering crops like winter wheat or forages in the cropping system can suppress weed growth. Highly competitive crops may be grown as short duration 'smother' crops within the rotation.

C. Intercropping

Intercropping involves growing a smother crop between rows of the main crop. Intercrops are able to suppress weeds. However, the use of intercropping as a strategy for seed control should be approached carefully. The intercrops can greatly reduce the yields of the main crop if competition for water or nutrients occurs. Intercropping of soybean and groundnut in upland rice, maize or sorghum greatly reduces the weed problem.

Cover crops offer many benefits to an organic farming system, including protection against soil erosion, improvement of soil structure, soil fertility enhancement, and weed suppression.

Intercropping

D. Mulching

Living mulching: Living mulch is usually a plant species that grows densely and low to the ground such as clover. Living mulches can be planted before or after a crop is established

Organic mulching: Organic mulches include many materials that can be produced

on farm such as hay, straw, grass mulch, crop residues, and livestock or poultry bedding. Other materials, such as leaves, composted municipal wastes, bark, and wood chips, may be available from off-farm sources.

Organic mulching

Living mulching

E .Stale Seedbed Preparation:

This weed management strategy consists of preparing a fine seedbed, allowing weeds to germinate (relying on rainfall or irrigation for necessary soil moisture), and directly removing weed seedlings via light cultivation or flame weeding.

F. Soil Solarization:

Solarization consists of heating the soil to kill pest organisms, including fungi, bacteria, and weed seeds. It also reduces populations of various pathogens and nematodes. Soil is covered in summer with clear or black polyethylene plastic and moistened under the plastic, which is left in place for six to seven weeks or longer. Weed seeds and young seedlings are killed by the heat and moisture and through direct contact with the plastic, which causes scorching.

B. Mechanical Weed Control

1. Flame Cultivation:

Broadcast flame cultivation prior to seeding the crop can be used effectively on most organically produced crops. It is more effective on a smooth soil surface than a rough or cloddy surface .

Flame cultivation

C. Biological Weed Control

Comercial Mycoherbicids:

Microorganism	Target weed	Ecosystem	Commercial product
Bipolaris sorghicola	*Sorghum halepense*		Biopolaris
Colletotrichum gleosp-orioides aeschynomene	*Aeschynomene viriginica*	Rice, soybean	Collego
Colletotrichum gloeos-porioides f.sp. *malva*	*Malva pusilla*	Wheat, horticultural crops	Biomal, Mallet
Colletotrichum gloeosp-orioides f.sp. *cuscutae*	*Cuscuta* sp.	Soybean	Lubao
Colletotrichum truncatum	*Sesbania exaltata*	Soybean, Cotton, rice	Coltru
Colletotrichum coccodes	*Abutilon theophrasti*	Maize, soybean	Velgo
Phytopthora palmivora	*Morrenia odorata*	Citrus groves	De Vine
Alternaria cassiae	*Cassia obtusifolia*	Soybean	CASST
Alternaria destruens	*Dodders*	Cranberry	Smolder
Puccinia canaliculata	*Cyperus esculentus*	Rice, horticultural crops	Dr.Biosedge

D. Approved Herbicides

A limited number of natural substances can serve as herbicides on organic farms.

Corn Gluten Meal:

The most widely used product in USA is corn gluten meal, a byproduct of cornstarch production. Corn gluten meal may be applied as a pre-emergence herbicide

Conclusions:

Effective weed management is the major challenge for successful organic farming. IWM comprising cultural, mechanical and biological practices are warranted for managing weeds in an eco-friendly way in organic farms. In addition to the growing concern for protection of environment, maintain biodiversity and protection of human and animal health, IWM approaches are also good ways of climate change mitigation. Careful selection of cropping systems (intercropping, crop rotation etc) and controlling weeds during critical period of crop-weed competition are important for sustainable weed management. Research efforts are required to develop location specific bio-herbicides for use in organic farms.

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