

Practical 8

IDENTIFICATION OF COMMON WEEDS OF ORCHARDS & VEGETABLE FARMS

EXERCISE

8.1 : Identification of common weeds of fruit orchards and vegetables farms

OBJECTIVES

- To learn how to identify the weeds present in fruit orchards and vegetable farms

Delivery schedule: 02 periods

Student expectations/learning objectives

- To know different monocot and dicot weeds of fruit orchards
- To identify different monocot and dicot weeds of vegetable farms
- To prepare a herbarium of weeds found in fruit and vegetable orchards
- To understand the importance of weed control in fruit and vegetable farms

Pre-learning required: Acquaintance with the losses caused by weeds and different kinds of weeds found near your locality.

Handouts/material/equipment's & tools required: Paper sheet and a pen to note down the characteristics of dicot and monocot weeds and material for collection of different weeds.

INTRODUCTION

Weeds are unwanted and undesirable plants, which grow voluntarily out of their place and compete with the cultivated plants for nutrients, moisture, light and space and thereby reduce the quality and quantity of the crop produce. Weeds can be classified and characterized on the basis of their life cycle, growing season, number of cotyledons, morphology, etc.

How to identify weeds in a fruit or vegetable garden?

There should be some criteria on which one can identify the weeds in a fruit or vegetable garden.

It is important to know the season in which the weed is growing, its life cycle, morphology etc. Keeping these criteria in mind, the weed plants can be classified as;

Based on life cycle: On the basis of life cycle, the weeds have been classified as annuals, biennials and perennials.

1. Annual weeds

Weeds of this group complete their life cycle in one season or year is called 'annual weeds'. They are usually small herbs with shallow root and weak stem. Most of the common weeds are annual. They are further divided into two groups based on their occurrence in different seasons:



Cyprus rotundus



Phalaris minor



Convolvulus arvensis



Vicia sativa

- a) **Monsoon annuals** (Kharif season): Such weeds emerge with the onset of rains and complete their life cycle before winter season or so. The seeds remain dormant in the

soil during cooler months and germinate with favourable temperature and moisture conditions during kharif season. Examples are *Echinochloa colomum* (water grass/*Jhanda*), *Euphorbia hirta* (Badi dudhi)

- b) **Winter annuals** (rabi season): Such weeds grow during winter season and produce seeds during spring or summer. Examples are, *Phalaris minor* (Canary grass/*Guli-danda*), *Vicia sativa* (Common vetch/*RoriRewari*).

2. **Bienimal weeds**

Those weeds that grow in the first season and complete their life cycle in the following season are referred as 'biennials'. In general, during first year, plants grow vegetatively and reproduce or form seeds in the second year. For example, wild carrot (*Daucus carota*). These weeds are difficult to control by removing aerial parts as roots help in their regeneration.

3. **Perennial weeds**

Those weed plants that live for more than two years. These are very well adapted to withstand adverse conditions. These weeds grow not only by seeds but also by underground stem and root



Lantana camara



Sorghum halepense



Wild senji



Parthenium (Congress grass)

suckers. These are difficult to control without consistent efforts. The weeds are further classified into herbaceous (without woody tissues) and woody perennials.

- a) **Herbaceous perennials:** Such weeds propagate through seeds (*sonchus arvensis*) or vegetative parts. The vegetative parts cut during cultivation and spread in the field and give rise to new weed plants. Examples are roots (*Convolvulus arvensis*) or crown (*Timothy* spp.) or bulb (*Allium* spp.) or rhizome (*Sorghum halepense*) or tubers (*Cyperus* spp.).
- b) **Woody perennials:** They are generally shrubs and bushes. Some common examples are *Lantana camara*, *Eupatorium adenophorum*, *Cannabis sativa* etc.



Cannabis sativa



Canary grass



Euphorbia hirta



Setaria glauca



Saccharum spontaneum



Chenopodium album

Based on morphology: The weeds are classified into three categories and is the most widely used classification.

1. **Broad leaved weeds:** Leaves are wide, veins branch out in different directions. This is the major group of weeds and include all dicotyledon weeds, e.g., *Euphorbia hirta* (Badi dudhi).
2. **Grasses:** Leaves are narrow, arranged in sets of two; stems are rounded or flattened. All the weeds belong to family Graminae are called as grasses e.g., *Echinochloa colomum* (water grass/Jhanda).



A fruit tree covered by *Amar bel* (*Cuscuta*)



Portulaca oleracea



Oxalis corniculata



Medicago denticulata

3. **Sedges:** Leaves are narrow, arranged in sets of three; stems are triangular in cross section. They resemble grasses and often grow in thick clusters. Sedges have a fibrous root system and may spread by underground rhizomes and/or aboveground stolons. Many sedges have tubers from which new plants can form. The weeds belonging to family Cyperaceae come under this group e.g., *Cyperus* spp.

Exercise 1: Identification of weed plants and recording of observations

Requirement: Fresh samples of weeds

Procedure: Observe different parts of the weed plants and record the observations in the data sheet on different characters such as root system (tap/fibrous), stem (herbaceous/woody), morphology etc. Based on these, identify the most prominent character along with name of the weed (Common/English/Botanical name).

S. No.	Local name	Botanical name	Crop in which growing	Season (Kharif/Rabi)	Root system (tap/fibrous)	Stem (herbaceous/woody)	Life cycle (Annual, Biennial, Perennial)	Morphology (grass, broad leaved, sedge)	Any other information
1									
2									
3									
4									
5									



Cynodon dactylon



Ageratum conyzoides

Aim: Preparation of herbarium of different weed plants

Weed plants can be preserved in their original form after drying them in a herbarium press. These pressed plants can be used for their identification during off-season.

Requirements: Blotting paper sheets, herbarium press, herbarium sheet, cello tape

Procedure

1. Collect weed plants with roots, leaves, flowers and seed.
2. Arrange the plant parts in normal position on a blotting paper sheet and also turn one or two leaves of this plant showing back surface.



Bidens pilosa



Amaranthus retroflexus



Setaria glauca

3. Write information about the habitat, date of collection etc.
4. Put these blotting paper sheets in herbarium press and give pressure by tightening the screws.
5. Turn the plants at frequent intervals.
6. After proper drying, mount the plants on herbarium sheet with the help of cello tape. Record the information on one corner of the sheet about its local name, common name, botanical name, locality, collection date, collected by, and notes if any.

Exercise: To conduct weed management in fruit and vegetable gardens

Weeds cause considerable losses to the crop by competition and allelopathic effects and are, therefore required to be managed before the critical period of competition with the crop to obtain higher production. The efficacy of different weeding management practices using hand tools and chemical methods can be shown to the students by conducting a visit to the experimental farm.

Requirements

Hand hoe, mechanical weeder, measuring tape, stop watch etc.

Procedure

A. *Mechanical weed control*

- Demarcate plots each having specific cropped area, which is infested with weeds.
- Individual student will remove the weeds with the help of hand tools like hoe and mechanical weeder in separate plots.
- The time of start of weeding and its completion will be recorded.
- Each student will record the time taken for weeding the assigned area with the help of any hand tool and will work out the efficacy of hand tool in hours/ha.
- The efficacy of hand tools will be calculated in terms of man hour per hectare. If a student takes 15 minutes to complete the weeding in 5 m² area with hand hoe, then the efficacy will be calculated for an hectare as :

$$\begin{aligned} \text{Efficacy (man hours per ha)} &= \frac{\text{Time taken to complete weeding} \times 10,000}{\text{Area covered} \times 60} \\ &= \frac{15 \times 10,000}{5 \times 60} = 500 \text{ man hours/ha} \end{aligned}$$

B. Chemical weed control

Student will record information on the name of herbicide, a.i. and dose and time of application for the control of weeds in different fruit or vegetable crops.

Exercise: Calculation of dose of herbicide in terms of active ingredient (a.c.)

Quantity of commercial product of herbicide (kg per ha)

$$= \frac{\text{Recommended dose of herbicide}}{\text{a. i of herbicide formulation}} \times 100$$

Solved example

If you buy pendimethalin with 50% a.i. and the recommended dose of application of this herbicide in cabbage is 1.5 kg/ha. Then, the quantity of commercial product required will be :

$$= \frac{1.5}{50} \times 100 = 3.0 \text{ kg/ha}$$

In this case, 3.0 kg of commercial product is added to the amount of water required for one hectare. Spraying herbicide with hand operated Knapsack Spray pump, water required to cover an hectare area varies from 750-800 litres

Calculation of quantity of water to be used

Quantity of water required per unit area (litre per unit area)

$$= \frac{\text{water required for one ha} \times \text{area to be sprayed}}{10,000}$$

STUDENT'S ACTIVITIES/EXERCISES

- Students should calculate the doses of herbicides for different situations.
- Participate in weed control operations in any of the fruit or vegetable crop and record different observations such as name of weed, crop infested by weeds, weed population & efficacy.

RESOURCE MATERIAL

- Bose, T.K. and Som, M.G. (1990). Vegetable crops in India. Naya Prokash, Kolkata.
- Bose, T.K. and others (1993). Fruit crops of India. Naya Prokash, Kolkata.
- Randhawa G. S. and Mukhopadhyay, A. (2007). Floriculture in India. Allied publishers Pvt. Ltd., New Delhi.

