



Identification of Various Weeds in Field Crops of Himachal Pradesh, India

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Abstract: *Himachal Pradesh is a northern state in the Himalayas. Shimla is the summer capital and Dharamshala is the winter capital. Himachal Pradesh is known for its Himalayan landscape and popular hill stations. About 93% area of the state population depends directly upon Agriculture. The major crops of Himachal Pradesh are wheat, maize mustard, vegetable like French-bean, brinjal, okra, cabbage, cauliflower, are the most important vegetable. Some weed compete with the main crop plant for air, water and important and essential nutrients in the soil. It's effect seen in main crop. Weed affect the growth of the plant and their removal is necessary, so some weed removal method is necessary they reduce weed population and their growth. In present research we find out the weed in fields crop and method apply to reduce their production for crop better yield and growth.*

Keywords: Weed, Weed Identifications, Weed Management, Weed Effect.

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1. Introduction

Himachal is an Indian state and is located in the Northern part of India. Himachal Pradesh is formed on 25 January 1971 and one of the mountain states. It shares borders with the union territories of Jammu and Kashmir and Ladakh to the north. Himachal Pradesh is famous for tourists destination and it is also called “Dev Bhomi” Agriculture Department was established in the year 1948 . Weeds reduce crop yield, but a recent paradigm shift suggests the mechanism underlying yield loss is the result of changes in crop development following perception of weeds early in the growing season [1]. The new paradigm implies that weeds reduce crop yield by inducing signalling processes that shift the development of crops from growth to defence, rather than by directly competing for resources needed by maize. This shift has resulted from studies that show weeds have their greatest impact on crop yield early in the growing season long before nutrients are limiting [2]. Intriguingly, even if weeds are removed after exposure to crops early in the season, crop yield loss is still significant. This early season window during which weeds have their greatest impact on crop growth is called the ‘critical period for weed control’.

Also, studies have demonstrated that enhancing the level of nutrients in the soil is not able to fully compensate for the presence of nearby weeds [3]. Thus, since direct competition for resources is not the primary means by which weeds reduce crop yield, then it should be possible to block those signals to create crops that are less responsive to weed presence. Apart from the detection of increased far-red light resulting from reflection of light from nearby weeds, where the mechanisms and molecular signalling processes are well understood [4]. How plants perceive other weed generated signals is still poorly understood. Crops are known to detect weeds from both above and below ground [5] and through chemical signals generated by weeds. It has long been [6]. However, the mode of action of these compounds are poorly understood. A recent study indicated the glucosinolates could act through down-regulating the target of rapamycin complex, which is an evolutionarily conserved signalling hub that regulates the balance between defence, nutrient availability and growth in both plants and animals [7]. Thus, it is tempting to speculate that this might be a common molecule by which plants recognise the presence of their neighbours understanding

[8]. In addition, algorithms have been developed to predict transcription factor signalling pathways, such as Spatiotemporal Clustering and Inference of Omics Networks [9]. Growing maize in rotation with cotton (*Gossypium hirsutum*) effectively controlled the infestation with Johnson grass (*Sorghum halepense*) in a maize – cotton – cotton – maize cropping system [10]. Continuous cropping produced the greatest weed densities of green foxtail (*Setaria viridis*), thyme-leaved spurge (*Euphorbia serpyllifolia Pers.*) and vetch (*Vicia sativa*). In most instances, Canada thistle (*Cirsium arvense*) was the most abundant weed on continuously cropped fields [11]. The green foxtail and wild oat (*Avena fatua*) densities increased in continuous monocropping of wheat [12, 13] reported a shift in the weed flora from annuals to perennials (*Cyperus rotundus*) in jute (*Corchorus olitorius*) when jute was rotated with a rice (*Oryza sativa*) – wheat (*Triticum aestivum*) system [14] observed a weed flora shift from dicots like *Trianthema portulacastrum* in the first year monocots like *Digitaria sanguinalis* in the second year of a maize-chickpea cropping system. Crop rotation may disrupt the continuous dominance of a specific weed in a field, decrease the buildup of the weed population, and prevent major shifts in weed

species composition. A Weed Shift refers to a change in the relative abundance, density, frequency or types of weeds as a result of management practice. The management practice could be any of the cultural, mechanical, chemical or biological that brings about change in weed species composition [15, 16]. It may also be due to the natural environmental changes in an agricultural system. There is a gradual increase in tolerant weed species [17]. These shifts are likely to occur in the agricultural production system that suggests changes in weed flora must be monitored continuously in all cropping systems and Agro-ecological regions [18].



Fig.1: (a) Map showing district Hamirpur, Bilaspur in Himachal Pradesh.

2. Method And Methodology

2.1 Study Area

Himachal Pradesh a hilly North-West Himalayan state, Known for its wide diversity of plant. It is one of the mountains states. Himachal Pradesh is situated at northern part of India. The total cropped area of Himachal Pradesh is 9,40,597 hectares and Bilaspur is the second smallest district (area wise) of Himachal Pradesh. Bilaspur district comes under sub-tropical climate zone. The net cultivated area of the district is 29,909 Hectares out of which only 3,164 is irrigated. Total production of the Agriculture produce in district is 41,706MT and other study area district is Hamirpur famous for the “Shri Baba Balak Nath Deoth sidh” district lies in south - west part of the state. The district falls in the humid sub-tropical zone. The climate of the district has four broad seasons.



Fig. 1.: (b) Map showing district Hamirpur, Bilaspur in Himachal Pradesh.

In Hamirpur people grow barely gram, Maize, paddy, rice as well as many vegetables crops. District. Bilaspur and Hamirpur region was chosen as the study area for the field with GPS location

2.2 Objectives

1. To identify various weeds in crops of Himachal Pradesh.
2. To understand the factors for growth of weed.
3. To test available tools and instrument for weed management in agriculture ecosystem.

2.3 Methodology

The present study is based on a carefully planned field visit. The study was carried out in 2023 in representative village field. For this study, primary data was collected from identifying various kinds of weed in the field crops which are seen in the field crops of Himachal Pradesh.

The secondary data relevant to the topic under consideration was collected from literature review different publications of state government (legal information). In addition the documents of various departments have provided valuable sources for the study.

3. RESULT AND DISCUSSION

During survey various weeds are identified among crops grown in Himachal Pradesh the description of the weeds identified is given below:



Fig.2 *Eleusine indica*

The salient features of *Eleusine indica* are as discussed below.

Local name of *Eleusine indica* is Goosegrass, yard grass, wire grass, or crowfootgrass. It belongs to the family Poaceae. It is a summer annual grass. Seed head appearance is like a goose. Goosegrass grows in compacted soils where there is a lot of traffic. In okra crop fields, *Eleusine indica* reduces crop production. It is a common weed in many crops.



Fig.3 *Digitaria sanguinalis*

Salient features of *Digitaria sanguinalis*:

Digitaria sanguinalis common name is crabgrass and is also known to be finger-grass. *Digitaria sanguinalis* belongs to the family Poaceae. It is a very common weedy grass found in many crop fields. It is a summer annual grass. Seed head is long, and stem is also long, soft and hairy along the underside. *Digitaria sanguinalis* grows in most soils, particularly heavy clay. *Digitaria sanguinalis* weed color is lime green. Roots are mostly fibrous. Leaves are flat. Plant growth is horizontal. It is used as animal fodder. This is a common weed in crops which can reduce.



Fig 4 *vicia sativa*



Fig.6 *Euphorbia hirta*



Fig.5 *Cyperus rotundus*

Salient Features of *Vicia sativa*: Common name of *Vicia sativa* is Common vetch, Garden vetch, Golden tare, vetch. It belongs to the family Fabaceae. It is an annual herb. It is a nitrogen fixing plant. Leaves are pinnately compound and flowers are pale pink purplish violet, rarely white. It has compound leaves.

Flowering time of *Vicia sativa* is from April to June. It is a weed of many agricultural crops.

Salient features of *Cyperus rotundus*

Cyperus rotundus (purple nutsedge) is a smooth, erect and perennial weed with an extensive subterranean tuber system. It usually attains a height of 30cm. Purple nutsedge appears grass-like, but its stems are triangular in cross-section. It has fibrous roots. Its leaves are mostly basal and linear in shape. It is a type of annual herb.

Salient features of *Euphorbia hirta*

Common names are Asthma herb, Badi dudhi and it is an annual plant. It belongs to the family Euphorbiaceae. It is a hairy herb present in roadsides, gardens, and mountains. Its stem is erect and flowers are surrounded by 4 round bracts.

which look like petals. The species is found in cropland and roadside area. when stem are broken it has milky white sap. It is used for many purposes for treatment of cough, asthma.

Weeds are the unwanted plants in crops which grows along with main crop .different type of weed in crop fields are *Eleusine indica*, *Digitaria sanguinalis* ,*Cyperus rotundus*,*Amaranthus viridis*,*Portulaca oleracea*,*Vicia sativa*, *Sonchus oleraceus*,*Cynodon dactylon* ,*Solanum nigrum*,*Echinochloa crus-galli*,*Medicago polymorpha* , *Parthenium hysterophorus*,*conyza canadensis*,*Commelina benghalensis*,*Physalis angulata*,,*chenopodium album*,*Asterstum conyzoides*,*Euphorbia hirta* , *Lactuca virosa* ,*Erigeron bonariensis*,.As the growing season progresses and plant start increase in size, weed begin to compete with the crop for air, light , space and essential nutrients for plant growth. Weed depend on these essential resources for plant growth. That result in decrease in growth of plant and reduce in crop yield potential. For managing crop growth and yield very important to remove the weed from the field. Most of weed get uprooted during the ploughing of fields but they reappear in field when the crop grows. The weeds spread

very fast because they produce a large quantity of seeds. The type of weed vary from field to field , from crop to crop and also from season to season. The process of removing weeds from a crop field is called weeding. Weeding is part for crop plant growth and development. The best time for the removal of weeds is before they produce flower and seeds. Different method for removal of weed by using a khurpi, digging or cutting, spraying special chemicals called weedicides . The poisonous chemical which are used to kill weeds in the field are called weedicides, A solution of the weedicides in water is sprayed on the standing crops in the field with sprayer. The weedicides destroy the weed but do not damage to the crop

2. Physical Method and mechanical method

The process of removing weed from the crop field is called physical and mechanical energy. In this type use of energy, animal power or fuel to run the tool for removing the weed . These type of method are old . first hand hoe first animal drawn implement invented by the jenthro tull in 1731.

Hand Weeding



Fig.7.: Hand weeding.



Fig.8 Hand hoeing.

Removal of weed with the help of hand when the weed grown in field crop. It is done with the help of sickle to prevent the weed growth.

Hand hoeing

Hand hoeing Taking out the weed from the field with the help of khurpi or hand hoes.

Sickling

It is also done by hand with the help of sickle.

It removes the top growth of weeds to prevent seed production.



Fig. 9.: Sickling

Mulching method

Help in preserving yield. Covering of the soil surface around the plants with an-organic. mulch to create good condition for crop growth.



Fig.10. Mulching



Fig.11.: cover crop

Crop are grown in field such a way that that manage soil fertility, weeds, pest and biodiversity of the particular area.



Fig. 12.: Burning

Cover crop



Fig.13.: Tillage



Burning

It involve eliminate unwanted in non-cropped area . It is used for the weed that are matured

Tillage

It is mechanical manipulation of soil with tools for better growth. In this method soil is manipulated with tool and instruments for removal of various weeds from the field

Chemical method of weed control

Chemical are used to kill the weed . It help in enhance the crop health different method are-used for. tillage, planting , fertiliser applications, irrigation

Chemical that used as weed killer called Herbicides or weedicides are sprayed on weed to

destroy them. Some example of weedicides are 2-4D (2,4dichlorophenoxy acetic acid).Selective herbicides control specific weed species while leaving the desired crop relatively unharmed

Cultural and Biological method of weed control

It also known as crop husbandry several cultural practice like proper bed preparation , timely sowing of crops , intercropping and crop rotation..

Field preparation

Make sure that field is weed free .seed flowing should not be their this help in preventing of growth of weed in crop field

Intercropping

Growing 2 or more crops simultaneously in a same field in a definite row pattern s called intercropping.

Crop rotation

Any agricultural practice in which different type of crop are grown alternately in the same field in a pre plan succession is called crop rotation

culture method used in weed management

Prey predator

Bioagents like insect , pathogen and other use to control the weed . In this method insect or other organisms which use to destroy the weed.

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