

# **CHEMICAL WEED CONTROL**

- The practice by which undesirable weeds are killed with chemicals is called **Chemical Weed Control (CWC)**.
- The chemicals that are used for killing or adversely affecting plant growth are known as **HERBICIDES**

# Reasons for popularity of CWC

- **Less drudgery than cultural methods**
- **Weeds can be selectively controlled without injury to crops**
- **Pre-emergence applications protect crops from early weed interference**
- **Field labor demand is lower than manual**
- **Little soil disturbance – hence reduced risk of erosion**
- **Faster than other methods**
- **More effective against perennial weeds**
- **Less likely to be adversely affected by erratic weather conditions**

# HOWEVER

- CWC is not a panacea for all weed problems in agriculture.
- A total dependence on CWC shows either
  - Improper understanding of the role of herbicides in weed control; or
  - **Outright abuse of the technology.**
- The indiscriminate use of herbicides and a total dependence on them has led to some adverse effect such as development of some **resistant weeds.**



# Herbicide classification

**Herbicides do not manifest the same type of disorder in susceptible plants.**

- **Herbicides can be classified depending on:**
  - **When they are applied**
  - **Type of application**
  - **Where they are applied**
  - **How they move in the plant**
  - **Type of plants killed**
  - **Chemical structure**
  - **Physiological action**

# 1. When they are applied

i. Pre-plant

ii. Pre-emergence

iii. Post-emergence treatments

– May be with respect to the crop or the weed

1.1 Pre-plant; Before crop is planted.

- Methyl bromide, Trifluralin etc.
- Increases reliability of control regardless of additional rainfall. But crop seed must have **TRUE TOLERANCE** to the herbicide

## 1.2 Pre-emergence

- PRIOR to emergence of specified crop or weed
- Treatment applied to soil surface.

## 1.3 Post-emergence

- Treatment AFTER emergence of specified crop or weed.
- E.g. 2,4-D gives effective post-em control for most broadleaved weeds in maize, sorghum, small grains and grass pastures, applied post-em to the crop but pre-em to the weeds.

## 2. Type of application

2.1 Broadcast: applied over the entire target area with weeds

2.2 Band treatment; method reduces chemical cost. Chemicals with long residual soil toxicity period are better applied this way because the smaller total quantity reduces residual danger to the succeeding crop. But risk of less effective control.

2.3 Directed sprays: targets individual weeds

2.4 Spot treatment: application is targeted on specific weeds or weed patches

# 3. Target of application

## 3.1 Foliar applied

- Enter plant primarily through foliage and can either exert their toxic effects on the foliage or translocate to other parts of the plant.
- Affected by rainfall (e.g. when applied < 3 hrs before the rains) e.g. Glyphosate

## 3.2 Soil applied

- Kill germinating weed seeds by imbibition or uptake by coleoptile / plumule.
- Need to go into soil solution for effectiveness. Therefore soil moisture important. Dry soils drastically reduce activity.

# 4.Type of movement within weed

## 4.1 Contact

- Exert their toxic effects at point of contact.
- E.g. Paraquat, Diquat, Propanil

## 4.2 Translocated / systemic.

- Move from point of application to other parts of the plant where their toxic effects are manifested.
- E.g. Glyphosate, Atrazine, Dalapon

# 5. Type of selectivity

## 5.1 Broad-spectrum.

- **N o n - s e l e c t i v e** herbicides that exert toxic effects on **ALL** plants they come into contact with.
- **Diquat, Glyphosate, Paraquat**

## 5.2 Selective

- **P r e f e r e n t i a l l y** kill **c e r t a i n** **p l a n t** **s p e c i e s** at recommended rates but will not harm other plants that they come into contact with.
- **2,4-D, Metalochlor**

# 6. Chemical structure

- Based on structural formula.
  1. INORGANIC
  2. ORGANIC
  3. BIOLOGICAL (E.g. Collego, Devine)
- Members of a group may differ in mode of action but most tend to affect same physiological processes.

# 7. Physiological action

- a) Mitotic disruptors; e.g. Carbamates, Dinitroanilines
- b) Photosynthetic inhibitors; S-Ureas, S-triazines
- c) Pigment inhibitors; Amitrole, Fluridone, Norflurazon

- **As with other methods of classification, no one method gives complete grouping of all herbicides.**
- **The choice of a method will vary with the intended use of the herbicide as well as other considerations.**