



HERBICIDES 101

Adapted from TechLine's Invasive Plant News – see "Factors Affecting Herbicide Performance" by C. Duncan (4/24/14)

Herbicide Mode of Action



Former CCT coordinator Mike Lynch treating common tansy

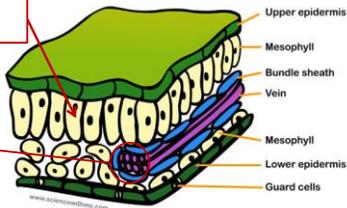
1. **Contact and absorption**
2. **Translocation** to the site of action
3. **Site of action** – there must be a specific location where the herbicide is toxic at the cell level
4. **Mechanism of action** – there must be a biochemical or biophysical process that the herbicide effects

Herbicide Uptake

Herbicides must pass through the leaf's surface

- Most absorption is done by:
- Guard cells
 - Cells surrounding hairs
 - Cells overlying veins

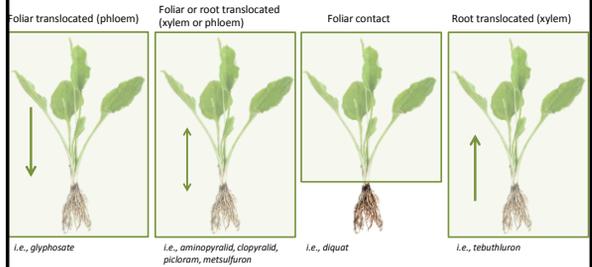
CROSS SECTION OF A LEAF



Once inside the leaf, herbicides move from cell to cell, or through the phloem

* Non-foliar herbicides can be absorbed in other ways, such as through the soil (roots, seeds, shoots)

Herbicide Translocation



Mechanism of Action

Mechanism of Action	Effect	Injury Symptoms
Amino acid synthesis inhibitors	Block synthesis of amino acids essential for the production of new cells	Stunted growth, leaf discoloration
Cell membrane disrupters	Rupture plant cell membranes	Death of plant tissue
Growth regulators	Mimic natural growth hormones responsible for cell elongation, protein synthesis, and cell division	Growth abnormalities: stem twisting, leaf malformations, stunted root growth
Lipid synthesis inhibitors	Block synthesis of lipids essential for the production of new cells	Decay, leaf discoloration
Photosynthetic inhibitors	Block photosynthesis	Yellowing of the leaf, death of plant tissue
Pigment inhibitors	Inhibit synthesis of photosynthetic pigments	White or translucent leaves
Respiration inhibitors	Interfere with the production of ATP, the major energy source for plants	Defoliation, brown desiccated plant tissue

Mechanism of Action

Mechanism of Action	Effect	Injury Symptoms
Amino acid synthesis inhibitors	Escort XP Rodeo	
Cell membrane disrupters	Rupture plant cell membranes	
Growth regulators	Milestone	
Lipid synthesis inhibitors	Block synthesis of lipids essential for the production of new cells	
Photosynthetic inhibitors	Rodeo	
Pigment inhibitors	Inhibit synthesis of photosynthetic pigments	
Respiration inhibitors	Interfere with the production of ATP, the major energy source for plants	

Mechanism of Action

Best application occurs:

- While plants are actively growing (*usually early summer*)
 - This can also mean underground roots on perennials (*fall*)
- During cool, wetter seasons
 - Hot, dry weather means thicker, more protective leaves that are less likely to absorb the herbicide
- Between 65 °F to 85 °F
 - Hot and cold temperatures slow plant metabolism and the herbicide may dry before it is completely absorbed
- On sunny days
 - Photosynthesis is faster on sunny days, which means other metabolic pathways are also faster
- With at least several hours before rainfall