Hormone herbicides & PPO Inhibitors

Terms to remember
- photosynthesis (food)
- respiration (energy)
- amino acids (proteins/growth)
- lipids (cell membranes)
- pigments (energy/light capture)
- mitosis (cell division)

Auxin Mimics
- Herbicides
  - 2,4-D & dicamba
- MOA
  - causes abnormal cell growth resulting in collapsing of vascular tissues
- Symptoms
  - twisting of leaves and stems on broadleaves
  - cupping & strapping of leaves on broadleaves
  - fusing of brace roots in corn
**2,4-D / Many Trade Names**

Used on corn, sorghum, wheat, pastures

- READ THE LABEL FOR SAFE APPLICATION TIMING

Available as acid, salts, amines, & esters

"Acid" is the active herbicide – NOT VOLATILE

Salts and Amines – NOT VOLATILE

Esters – VOLATILE C5 &< LOW VOL C6 &>

Why keep esters?

**2,4-DB / Butyric**

Requires metabolism (beta oxidation) to become active in the plant

Peanuts, Alfalfa, and Soybeans

Many tank mixes

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**MCPA / Many Trade Names**

Rice, small grains, flax, peas, turf, pastures and rangeland

Safer than 2,4-D on wheat

Usually mixed with other herbicides

**Dicamba / Banvel, Clarity, Distinct**

Corn, sorghum, small grains, asparagus, turf, pastures and non-crop

Has soil residual activity

Will leach, do not use under tree dripline

Generally controls difficult to control broadleaf weeds better than 2,4-D

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**Clopyralid / Stinger, Reclaim, Transline**

Stinger – sugar beets, corn, small grains, pastures & rangeland

- Canada thistle control in Midwest!!!!

Reclaim – Specialty product for OK, NM, & TX

- Mesquite, acacias, other woody species

Transline – Industrial sites, rights-of-way, non-crop

Obviously each with a different price.

**Picloram / Tordon**

- Restricted Use Herbicide
- Very active on non-target plants
- Ground water hazard
- Reasonably long residual life
- CRP, pastures and rangelands, fallow crop land and fallow small grains
- NOT FOR RESIDENTIAL USE

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NOT FOR RESIDENTIAL USE
Triclopyr / Garlon, Redeem, Remedy, Grandstand, Pathfinder
- Garlon – only non-cropland use
- Redeem and Remedy – pastures and rangeland, mesquite control, & other brush
- Grandstand and Redeem – Xmas trees
- Pathfinder – stump treatment

PPO Inhibitors / Diphenyl ethers
Mode of Action – Inhibit chlorophyll synthesis

Location of activity in plant
1. Contact type herbicides so they inhibit chlorophyll production only in the leaves they contact

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PPO Inhibitors / Diphenyl ethers
Selective postemergence control of broadleaves in crops

Chemical properties
- Can persist for several weeks / months – some concerns for rotational crops
- No big leaching or photo-decomposition concerns

PPO Inhibitors / Diphenyl ethers
Herbicidal properties
- Generally fast acting contact-type herbicides
  a) Some crop injury can be expected
- Little if any translocation when taken up by shoots
  a) Fomesafen can be taken up by roots and translocated
  b) Carryover concerns
Selectivity
- Broadleaves are generally sensitive
- Tolerant plants rapidly metabolize the herbicide
- Coverage is Important

Spurges, morning glory, poor grass control
- Limited soil activity – from control stand point
- Inhibit chlorophyll synthesis
- Antagonistic with many grass control herbicides

FOMESAFEN
Specific PPO Inhibitors

**Acifluorfen / Ultra Blazer**
- Soybeans, rice & peanuts
- Leaf bronzing
- Many tank mixes and some premixes
  a) With Basagran (Storm – south & Galaxy – north)

**Leaf Bronzing with Blazer**

**Sorghum injury from Blazer**

**Veinal Chlorosis from fomesafen carryover**

**Lactofen / Cobra**
- Cotton (PDS), soybeans, southern pine seedbeds
- Better than Blazer, but causes more injury
- Grass control
Oxyfluorfen / Goal

- PRE uses – conifers, fruit and nut trees
  a) This herbicide has soil residual activity
- POST – directed, crop injury if over-the-top. – Cotton uses