Herbicide Injury in Christmas Trees
Objectives
Application Types

Broadcast

Direct

Over The Top
Classifying the Herbicides

• Postemergence
  o Contact Vs Translocated
  o Selective Vs Nonselective
  o Residual / Nonresidual

• Preemergence
  o Selective
  o Residual
Postemergence Nonselective

• **Contact**
  Finale – Glufosinate
  Reward – Diquat
  Scythe – Pelargonic Acid
  Octane 2 - Pyraflufen-ethyl

• **Translocated**
  Roundup Pro / Rodeo - Glyphosate
  Touchdown - Sulfosate
How does Glyphosate work??
Glyphosate kills plants by inhibiting 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS). EPSPS is a key enzyme in the shikimate biosynthetic pathway which is necessary for the production of the aromatic amino acids, auxin, phytoalexins, folic acid, lignin, plastoquinones and many other secondary products. Over 30% of the carbon fixed by plants passes through this pathway. Inhibition of EPSPS by glyphosate deregulates the pathway, leading to even more carbon flowing through the pathway with accumulation of shikimate and shikimate-3-phosphate. Up to 16% of the plant’s dry matter can accumulate as shikimate. Glyphosate occupies the binding site on EPSPS for phosphoenol pyruvate, a substrate of EPSPS, by mimicking an intermediate state of the enzyme-substrates complex. There are two forms of EPSPS in nature, EPSPS I, which is found in plants, fungi, and most bacteria, and is sensitive to glyphosate, and EPSP II, which is found in glyphosate resistant bacteria and is not inhibited by glyphosate. It is the gene for an EPSPS II that has been used to genetically engineer resistance in crops. The shikimate pathway is most active in meristematic tissue. Hence, glyphosate has to translocate to the meristematic tissue to be effective. Glyphosate translocates in the plant from a source to sink direction. Up to 70% of absorbed glyphosate can translocate out of the treated leaves to the root and shoot apices. However, glyphosate translocation is selflimiting and only occurs for the first 48-72 h after application. The reason for this selflimiting phenomenon is not clear, but is related to the site of action of the herbicide, since there is greater translocation in glyphosate resistant crops compared to susceptible plants. Glyphosate’s ability to translocate readily in plants results in it controlling not only annual, but also perennial weeds.
pathway which is necessary for the production of the aromatic amino acids, auxin, phytoalexins, folic acid, lignin, plastoquinones and many other secondary products.

The shikimate pathway is most active in meristematic tissue. Hence, glyphosate has to translocate to the meristematic tissue to be effective. Glyphosate translocates in the plant from a source to sink direction. Up to 70% of absorbed glyphosate can translocate out of the treated leaves to the root and shoot apices. However, glyphosate translocation is selflimiting and only occurs for the first 48-72 h after application.
Glyphosate Damage
Fraser fir - will grow out of damage

Chemical pruning
Glyphosate Damage

White Pine - liner beds
Glyphosate Damage

White Pine - loss of apical dominance
Glyphosate Damage

White Pine - erratic damage
Douglas Fir
- Off-coloring
- Deformed leaders
- Loss of apical dominance
Glyphosate Damage

Colorado Spruce
- Deformed leaders
- Loss of apical dominance
Goal Damage
Goal Damage

Hemlock

Fraser fir
Goal Damage

Colorado Spruce
Goal Damage

Only needles are burned - Plant will recover with minimal damage
Scotch Pine

Needle cast disease
Colorado Spruce

Heat injury
Fraser Fir

Frost Injury

Douglas Fir
Colorado Spruce
Frost damage

Cooley’s spruce gall adelgid
Simazine

- Photosynthesis Inhibitor
Simazine damage in conifer
Simazine damage increases with the rates
Colorado spruce following season
Crop loss due to poor calibration
Grower used mist sprayer to apply herbicides
Basagran Damage

Slight injury to Colorado Spruce
Hormone Activity

- 2,4-D
- Banvel
- Garlon
- Lontrel
New growth after drift, miss-application of lawn treatment
Previous seasons damage
Root absorbed dicamba
Dinitroanilines (DNA’s)

Inhibit Root Growth

- Surflan
- Pendulum
- Barricade
- Treflan
Surflan Damage
Surflan Damage
The Application Site – Intermittent Waterways

Intermittent waterway

Photos: Tracey Harpster, Penn State
The Application Site – Intermittent Waterways

Photos: Tracey Harpster, Penn State
The Application Site

Dual II Magnum®

Herbicide
For weed control in beans, peas, and lentils; corn; cotton; grasses grown for seed; horseradish; peanuts; potatoes; pumpkin; rhubarb; safflowers; sweet, grain, or forage sorghum; soybeans; soybeans, immature seed; sugar beets; sunflowers; and tomatoes.

Surface Water Advisory
The active ingredient in Dual II Magnum has the potential to contaminate surface water through ground spray drift. Under some conditions, the active ingredient may also have a high potential for runoff into surface water (primarily via dissolution in runoff water) for several months post-application. These include poorly drained or wet soils with readily visible slopes toward adjacent surface waters, frequently flooded areas, areas overlaying extremely shallow ground water, areas with in-field canals or ditches that drain to surface water, areas not separated from adjacent surface waters with vegetated filter strips, and areas overlaying tile drainage systems that drain to surface water.

EPA Reg. No. 100-819
EPA Est. 11773-IA-01
Product of Switzerland
Formulated in the USA
SCP 818A-L1S 0714
4041142

2.5 gallons
Net Contents
Mixing/Loading Instructions

Care must be taken when using this product to prevent back-siphoning into wells, spills, or improper disposal of excess pesticide, spray mixtures, or rinsates.

Check-valves or antisiphoning devices must be used on all mixing and/or irrigation equipment.

This product may not be mixed or loaded within 50 ft. of perennial or intermittent streams and rivers, natural or impounded lakes, and reservoirs. This product may not be mixed/loaded or used within 50 ft. of all wells, including abandoned wells, drainage wells, and sink holes. Operations that involve mixing, loading, rinsing, or washing of this product into or from pesticide handling or application equipment or containers within 50 ft. of any well are prohibited, unless conducted on an impervious pad constructed to withstand the weight of the heaviest load that may be positioned on or moved across the pad. Such a pad shall be designed and maintained to contain any product spills or equipment leaks, container or equipment rinse or wash water, and rain water that may fall on the pad. Surface water shall not be allowed to either flow over or from the pad, which means the pad must be self-contained. The pad shall be sloped to facilitate material removal. An unroofed pad shall be of sufficient capacity to contain at a minimum 110% of the capacity of the largest pesticide container or application equipment on the pad. A pad that is covered by a roof of sufficient size to completely exclude precipitation from contact with the pad shall have a minimum containment capacity of 100% of the capacity of the largest pesticide container or application equipment on the pad. Containment capacities as described above shall be maintained at all times. The above-specified minimum containment capacities do not apply to vehicles when delivering pesticide shipments to the mixing/loading site.
Remember

The user’s responsibility is to read and understand the label before buying, using, storing, transporting, or disposing of the pesticide.

The Label is the Law –  
Always Read the Label First!
Questions
Questions??
General Growth Inhibitors

- Casoron
- Devrinol
- Gallery
  - Snapshot
- Pennnant