Ornamental Horticulture Workshop
Cleveland, OH

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Crop Safety:

- **New Herbicide Formulations**
  
  - **2008**
    - Flumioxazin (Broadstar 0.25 G)
    - Mesotrione G – *Injurious and not evaluated in 2009*
    - Imazasulfuron (V-10142 0.5G) – *Not evaluated in 2009*
    - FreeHand (Dimethenamid-p + pendimethalin)
    - Tower (Dimethenamid-p)
  
  - **2009**
    - Sulfosulfuron
    - Trifluralin + Isoxaben (Snapshot 2.5TG) – *only 2 species eval.*
    - Flumioxazin (Broadstar 0.25 G)
    - FreeHand (Dimethenamid-p + pendimethalin)
    - Tower (Dimethenamid-p)
    - Biathalon (Oxyfluorfen + Prodiamine)
Methods

- Treatments included the 1x, 2x and 4x rates of each herbicide.
- The first herbicide application was applied to actively growing plants soon within one week of transplanting.
- All treatments were reapplied 4 to 6 weeks after the first treatment (except Flumioxazin).
- Randomized complete block design
- Three of each species per treatment in each of 4 replicates.
Application Methods

- **Spray/ liquid formulations**
  - Backpack CO2 sprayer with a mix size of 1 liter and application volume of 20 gal/acre.
  - Sprayed over one square meter area

- **Granular Formulations**
  - Herbicide spreader
Safety of Broadstar 0.25 G

- Tested for safety in 5 species in 2008
  - *Rhododendron* ‘Midnight Flare’
  - *Juniperus conferta*
  - *Camellia sasanqua* ‘Red’
  - *Buxus* ‘Wintergem’
  - *Spiraea* ‘Dolchica’

- Tested for safety in 3 species in 2009.
  - *Lavandula angustifolia* ‘Munstead’
  - *Abelia x grandiflora* ‘Edward Goucher’
  - *Pieris japonica* ‘Mountain Fire’

- All species showed high levels of tolerance.
- Only minor injury in *Spiraea* ‘Dolchica’
Spiraea ‘Dolchica’

control 150 lb product/acre 300 lb product/acre 600 lb product/acre

Broadstar 0.25 G VC1604 = 4 WAT
Lavandula angustifolia ‘Munstead’

PR# 27171

150 lb/ acre  500 lb/ acre  600 lb/ acre  control

Broadstar 0.25G VC1604 = 4 WAT
Abelia x grandiflora ‘Edward Goucher’

PR# 27076

150 lb/ acre  500 lb/ acre  600 lb/ acre  control

Broadstar 0.25G VC1604 = 4 WAT
Safety of FreeHand

- Tested for safety in 9 species in 2008
  - *Camellia japonica* ‘Fireball’
  - *Amsonia hubrichtii*
  - *Aquilegia caerulea* ‘Songbird Blue Jay’
  - *Sambucus nigra* ‘Black Lace’
  - *Agapanthus africanus* ‘Alba’
  - *Anemone* ‘Pamina’
  - *Agastache bareri* ‘Tutti Frutti’
  - *Achillea* ‘Moonshine’
  - *Asclepias incarnata*

- Tested for safety in 8 species in 2009.
  - *Lavandula angustifolia* ‘Munstead’
  - *Catharanthus roseus* ‘Titan White’
  - *Helianthus* ‘Table Mountain’
  - *Pieris japonica* ‘Mountain Fire’
  - *Asclepias tuberosa*
  - *Agastache* ‘Black Adder’
  - *Armeria maritima* ‘Splendens’
  - *Verbena x canadensis* ‘Homestead Purple’
Safety of FreeHand

- Safe in most woody species evaluated
- First treatments safe in perennial species
  - Second applications resulted in most injury for species like *Aquilegia*, *Amsonia*, and *Sambucus*
- 2x and 4x rates were injurious to annuals
Sambucus nigra ‘Black Lace’

BAS 659H G (dimethenamid + pendimethalin)

4 WAT second treatment
Agastache barberi ‘Tutti Frutti’

BAS 659H G (dimethenamid + pendimethalin)
4 WAT first treatment
Catharanthus roseus ‘Titan White’

PR# 28179

150 lb/ acre  500 lb/ acre  600 lb/ acre  control

Freehand G = 4 WAT
Helianthus ‘Table Mountain’

PR# 26446

150 lb/ acre  500 lb/ acre  600 lb/ acre  control

Freehand G = 4 WAT
Pieris japonica ‘Mountain Fire’

PR# 27210

150 lb/ acre  500 lb/ acre  600 lb/ acre  control

Freehand G = 4 WAT
Safety of Tower

- Tested for safety in 1 species in 2008
  - *Camellia sasanqua* ‘White’
- Tested for safety in 6 species in 2009.
  - *Lavandula angustifolia* ‘Munstead’
  - *Abelia x grandiflora* ‘Edward Goucher’
  - *Pieris japonica* ‘Mountain Fire’
  - *Pinus strobus*
  - *Viburnum nudum* ‘Winterthur’
  - *Viburnum opulus* ‘Roseum’
- All species showed high levels of tolerance at all rates except *Viburnum*. 
Camellia sasanqua ‘White’

BAS 656h EC = 4 WAT first treatment
Pieris japonica ‘Mountain Fire’

PR# 27209

21 fl oz/ acre  42 fl oz/ acre  84 fl oz/ acre  control

Tower EC = 4 WAT
Viburnum nudum ‘Winterthur’

PR# 27422

21 fl oz/ acre  42 fl oz/ acre  84 fl oz/ acre  control

Tower EC = 4 WAT
Viburnum opulus ‘Roseum’

PR# 27423

21 fl oz/acre  42 fl oz/acre  84 fl oz/acre  control

Tower EC = 4 WAT
Safety of Sulfosulfuron

- Tested for safety in 10 species in 2009
  - Lavandula angustifolia ‘Munstead’
  - Abelia x grandiflora ‘Edward Goucher’
  - Pieris japonica ‘Mountain Fire’
  - Pinus strobus
  - Agastache ‘Black Adder’
  - Catharanthus roseus ‘Titan White’
  - Helianthus ‘Table Mountain’
  - Asclepias tuberosa
  - Armeria maritima ‘Splendens’
  - Verbena x canadensis ‘Homestead Purple’

- All species showed injury to sulfosulfuron except Verbena, Pieris and Abelia.
Lavandula angustifolia ‘Munstead’

PR# 28621

1.25 oz/acre  2.5 oz/acre  5.0 oz/acre  control

Sulfosulfuron = 4 WAT
Pinus strobus

PR# 28650

Sulfosulfuron = 4 WAT
Catharanthus roseus ‘Titan White’

PR# 28563

1.25 oz/ acre 2.5 oz/ acre 5.0 oz/ acre control

Sulfosulfuron = 4 WAT
Helianthus ‘Table Mountain’

PR# 28601

1.25 oz/ acre  2.5 oz/ acre  5.0 oz/ acre  control

Sulfosulfuron = 4 WAT
Safety of Biathalon

- Tested for safety in 10 species in 2009
  - *Berberis thunbergii* ‘Helmond Pillar’
  - *Potentila fruticosa* ‘Abbotswood’
  - *Cornus stolinifera* ‘Arctic Fire’
  - *Gardenia jasminoides* ‘Daisy’
  - *Juniperus virginiana* ‘Grey Owl’
  - *Hibiscus syriacus* ‘Sanchoyo’
  - *Rosa* ‘Candy Oh Vivid Red’
  - *Taxus x media* ‘Margarita’
  - *Cryptomeria japonica* ‘Yoshino’
  - *Euonymus fortunei*
  - *Hydrangea macrophylla*

- All species showed tolerance to Biathalon
Berberis thunbergii ‘Helmond Pillar’

PR# 28986

100 lb/ acre  200 lb/ acre  400 lb/ acre  control

Biathlon = 4 WAT
Potentilla fruticosa ‘Abbotswood’

PR# 29053

100 lb/ acre  200 lb/ acre  400 lb/ acre  control

Biathalon = 4 WAT
Cornus stolonifera ‘Arctic Fire’

PR# 29002

100 lb/ acre  200 lb/ acre  400 lb/ acre  control

Biathalon = 4 WAT
Future Priorities:

- Over-top applications of Tower (pendimethalin) for safety in ornamentals (herbaceous and woody).
- Expansion of Freehand label for crop safety.
- Sedgehammer for nursery production. Over-top or post-directed however we can get it.
- Expansion and wrapping up of Broadstar label for crop safety.
- Additional Priorities:
  - Clopyralid: for eclipta and groundsel control
  - Casoron: for horsetail control, liquid formulation
  - Biathalon: crop safety
  - 2,4-D: for production of ornamental grasses and dormant nursery applications
  - Scott’s product: oxadiazon + pendimethalin combo for ornamentals mainly perennials