DAS Product Portfolio

- Accord Concentrate
- Accord XRT II
- DMA 4
- Garlon 3A
- Garlon 4 Ultra
- Garlon XRT
- Milestone VM Plus
- Milestone VM
- Pathfinder II
- Pathway
- Rodeo
- Spike
- Tordon 101, K
- Transline
- Vista

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Herbicide Tools for Weed and Brush Control

- Selectivity
- Milestone VM and Transline in native plantings
- Garlon products for brush control
- Methods of application
- Application timing

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Selectivity – Part of the Prescription

- **Selective** herbicides are those which are active on a limited range of species.
- **Non-selective** herbicides are those which are active on all, or almost all, species.
- Some herbicides are selective at low rates, and non-selective at higher rates.
Selective vs. Non-Selective Herbicides

- Chose selective control to protect perennial ground cover:
  - maintain desirable plants vs. weeds
  - protect wildlife habitat
  - minimize erosion

- Use non-selective products for total vegetation control:
  - Site preparation, guardrails, curbing, substations, storage yards, etc.
Selective Herbicides

- Selective herbicides generally do not affect grasses, but do control broadleaves and woody vegetation.
  - Milestone VM
  - Garlon
  - Tordon
  - 2,4-D
  - Transline
Non-Selective Herbicides

- Non-selective herbicides control all vegetation (grass, broadleaf, woody).
  - Accord/Rodeo/Roundup
  - Arsenal/Sahara/Habitat
Selectivity Depends on Rate

- Some herbicides can be selective at low rates, and non-selective at higher rates.
  - Telar
  - Escort
  - Spike
  - Correct calibration is crucial.
Milestone™ VM Herbicide

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Characteristics of Milestone™ VM

- New generation active ingredient effective at reduced use rates compared to other herbicides with same mode of action
- Developed specifically for non-crop broadleaf weed control including control of many noxious and invasive plants
- Active on some brush species, including aspen and elm

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Characteristics of Milestone™ VM

- Not a federally Restricted Use Pesticide
- Selective to most warm- and cool-season perennial grasses
- Very low toxicity ("practically non-toxic") to birds, fish, mammals and aquatic invertebrates
- Surface water breakdown in less than 24 hours
- Tank-mix flexibility and compatibility
- Reviewed and registered under the Reduced Risk Pesticide Initiative of the U.S. Environmental Protection Agency

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EPA has established a reduced risk program to encourage development and use of lower risk pesticides by expediting the review of new active ingredients that meet EPA's reduced risk criteria...
What is Reduced Risk?

A reduced risk pesticide use is defined as one which "may reasonably be expected to accomplish one or more of the following":

1. reduces pesticide risks to human health;
2. reduces pesticide risks to non-target organisms;
3. reduces the potential for contamination of valued, environmental resources, or
4. broadens adoption of IPM or makes it more effective
Aminopyralid was accepted for evaluation under U.S. EPA's Reduced Risk Pesticide program in October 2004.

Acceptance for evaluation was based, in part, on:

- Improved control of invasive plants compared to market standards
- Lower use rates than most market standards
- Favorable data and risk assessment studies for toxicological, ecotoxicological and environmental fate
Characteristics of Milestone™ VM

- Low use rate of 3 to 7 fluid oz/acre (0.06 to 0.1 lb ae/acre); spot treatments up to 14 oz/acre
- Soil residual for season-long control of newly germinating seeds
- Can be applied to “seasonally dry wetlands”
  - Spray up to the waters edge
  - Apply to sub-irrigated meadows

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Formulation

- **Milestone™ VM**
  - 2 lbs ae/gal, triisopropanolammonium salt formulation
  - Rate range = 3 to 7 fluid oz/acre
  - Over 50 weed species controlled
  - No grazing or haying restrictions
  - No groundwater advisory
  - Caution signal word

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Milestone™ VM Use Sites

- For control of broadleaf weeds, including many invasive and noxious weeds, on non-cropland areas including:
  - rights-of-way (such as roadsides, electric utility and communication transmission lines, pipelines, and railroads)
  - non-irrigation ditch banks
  - Industrial sites
  - Natural areas (such as wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails)
  - and grazed areas in and around these sites.

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Milestone™ VM
Ecotoxicology Review

- Low acute and chronic toxicity to mammals, birds, fish, aquatic and terrestrial invertebrates, algae and aquatic vascular plants
- Risk of adverse effects is substantially below all of the US EPA levels of concern for non-target organisms
- Produces no significant metabolites in soil or water other than CO₂ and NH₃
- Does not bioaccumulate

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How Close to Water Can I Spray?

- Milestone™ VM applications can be made right up to the water’s edge with the following guidelines:
  - Do not contaminate water intended for irrigation or domestic purposes. Do not treat inside banks or bottoms of irrigation ditches, either dry or containing water, or other channels that carry water that may be used for irrigation or domestic purposes.
  - Chemigation: Do not apply this product through any type of irrigation system.

- It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands (such as flood plains, deltas, marshes, swamps, or bogs) and transitional areas between upland and lowland sites.
Milestone VM is Effective on Key Noxious Weeds

- Canada thistle
- **Spotted knapweed**
- Diffuse knapweed
- **Russian knapweed**
- Yellow starthistle
- Musk thistle

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Aminopyralid Control of Canada Thistle with Summer Applications at Prebud

Evaluations at 1 year after treatment. Average of 7 to 14 sites (MN, MT, ND, NE, OR, VA, SD, WA, and WY)
Control of Canada Thistle with Fall Applications of Aminopyralid Compared to Standards

Evaluations at 1 year after treatment. Average of 5 sites North Dakota (2), Nebraska, Virginia, and Washington
Canada Thistle Control with Two Application Timings
St. Hilaire, MN (Evaluated on July 6, 2006)

Summer treatments on July 8, 2005 to CT in late bud stage

- Milestone*
- Curtail* 2 pt/a
- Tordon* 1.5 pt/a
- Clarity^+ 2.4-D 1 pt+2pt
- Cimarron** Max 0.25 oz+ 1 pt

Fall treatments on Sept. 23, 2005 to 6-8 inch re-growth
Canada Thistle Control

- **Milestone VM is superior**
- **Timing:** any time after full emergence of thistles
- **Rate:** 5-7 oz/acre
- **The addition of a surfactant is suggested**
Canada Thistle Control

- Transline also provides good thistle control
- Woody plants are tolerant
Biennial Thistle Control

- Musk thistle
- Plumeless thistle
- Bull thistle

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Musk Thistle
(*Carduus nutans*)
Plumeless Thistle
(*Carduus acanthoides*)

Bagley, Minnesota
Biennial Thistles: Milestone VM
Rate Recommendations

- **Spring Rosette**
  - 3 to 5 fl oz/acre

- **Bolted Plants**
  - 3 to 5 fl oz/acre

- **Late Bolted Plants**
  - 4 fl oz/acre

- **Fall Rosette**
  - 4 fl oz/acre

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Spotted Knapweed
Spotted Knapweed Control (1 & 2- YAT)
Rosette/Bolting Growth Stage Application

Percent control

<table>
<thead>
<tr>
<th>Milestone (Aminopyralid) per acre</th>
<th>4 fl oz</th>
<th>5 fl oz</th>
<th>7 fl oz</th>
<th>Tordon* 22K 1 pt/ac</th>
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<tr>
<td>No significant difference</td>
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<tr>
<td>LSD (P=0.05)</td>
<td></td>
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</tr>
</tbody>
</table>

1 YAT Evaluations average of 5 locations: Montana (3), Idaho (1), Washington (1), 2 YAT, Montana (1)
Milestone and Spotted Knapweed

- Aggressive invasive
- Biennial/perennial weed
- Likes poor soils and droughty conditions
- Allopathic
- Unpalatable to livestock
Clearwater County Gets to the Root of their Knapweed Problem

- **2006:**
  - Hired a part-time summer project coordinator
  - Operational Milestone VM vs. 2,4-D roadside trials
  - Gravel pits trial-treated with Milestone VM

- **2007:**
  - Operational Milestone VM work on roadsides
  - Six gravel pits in the county treated with Milestone VM
  - Task force established for Gravel Pit Certification

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Clearwater County Gets to the Root of their Knapweed Problem

- 2008

  - Task Force developed recommendations for a gravel pit certification program that went to the County Board of Commissioners and was approved.
    - Voluntary; 7 year commitment
    - County designs a weed management plan; twice yearly inspection
    - County will use gravel from certified pits only
Spotted Knapweed

- **Milestone Label Rate:** 5-7 fl oz/acre
- **Application Timing:** spring pre-bud or fall regrowth
- **Residual control 2-4 years**
Wild Parsnip
Pastinaca sativa

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Wild Parsnip

- Phytotoxic plant
  - When human skin is exposed to the juice of the plant, then exposed to ultra violet light, severe irritation, pain and blistering occur 24-48 hours after exposure, often leaving brown scars.
  - Ultraviolet light is present outdoors on sunny **AND** cloudy days
Wild Parsnip

- A monocarpic perennial, which means it spends one or more years as a basal rosette.
- Tolerant of a wide range of conditions, including dry, mesic, and wet-mesic prairies; oak openings; and calcareous fens.
- It is shade-intolerant and prefers sunny conditions.
- This species is an aggressive, Eurasian weed that frequently invades and modifies a variety of open habitats.
Wild Carrot
*Daucus carota*

Biennial, non-native invasive weed.
Degrades prairie and native grasslands
Wild Parsnip/Wild Carrot Control

- Mowing after seed has set accelerates the spread by dispersing seed.
- Herbicides active on wild parsnip and wild carrot include DMA4, Escort and Milestone VM.
  - 2 qt. DMA4 or 5-7 oz Milestone VM combined with 1 oz Escort
A Systems Approach in Native Plantings

- Need for invasive weed and brush control in prairies
  - Prior to planting (site prep)
  - after establishment
- Dow AgroSciences and our cooperators continue to explore how our products can be utilized to control invasive weeds and promote the integrity of native habitats
  - 2007/2008 Forb tolerance studies in prairie plantings
  - 2009 Pre-plant spray species tolerance

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# Forb Tolerance

**Minneapolis Rankings for Native Forb Tolerance to Aminopyralid and Clopyralid Herbicides**

This table reflects estimates of native forb tolerances to aminopyralid (Bisinte MS 2) and clopyralid (Transline®) based on field observations. Generally speaking, tolerances were improved with spring applications compared to the applications in Fall 2006. Visible weed stress present in the stand from herbicide applied can vary from establishment to establishment following herbicide application. These rankings reflect our experiences as of Fall 2006 and will be updated as more data becomes available.

**T= Tolerant**  
**M= Moderate tolerance**  
**MT= Moderately tolerant**  

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Family</th>
<th>Genus</th>
<th>Species</th>
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<tbody>
<tr>
<td>Alexander, Goldenseed</td>
<td>Fabaceae</td>
<td>Vicia</td>
<td>minorana</td>
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<tr>
<td>Alexander, Heart-leaved</td>
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<td>Vicia</td>
<td>minorana</td>
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<td>Monarda</td>
<td>didyma</td>
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<td>stricta</td>
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<td>Yellow, Common</td>
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What Is In Our Toolbox?

- High Volume Foliar
- Low Volume Foliar
- Basal Bark
- Cut Surface
- Cut stubble
- Mechanical
- Biological
- Burning
- Brown Brush Monitor
- Continuum*
Woody Plant Control
High Volume Foliar

- Brush control for high density stem counts
- Calibrate your equipment for spray volumes of 100 GPA
- Use Surfactants, drift control agent
- Spray to wet
- Be aware of what is around you (crops, homes, etc.)
Low Volume Foliar

- For spotty or low density weeds and brush.
- Calibrate for 50-75 GPA
- Cover 80% of leaf surface with special attention to the growing points
- Consider the height and density of the vegetation
- Use surfactants
- Spray to wet

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### Products for Foliar Application

- Accord
- Garlon 3A
- Garlon 4 Ultra
- Tordon 101
- Tordon K
- Milestone VM
- Milestone VM Plus
- DMA4
- Transline
- Vista

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Basal Bark Application

- Year round treatment for low density woody vegetation and sensitive sites
- Coverage of the entire stem circumference is key to success
- On root suckering species, make sure collar area is covered, treat root flares, or exposed roots
- Do not treat when bark is wet

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Basal Bark Products

- Garlon 4 Ultra + Bark Oil
- Pathfinder II
Cut Surface Products

- Pathway*
- Pathfinder II
- Garlon 4 Ultra
- Garlon 3A*
- Accord Concentrate*

*Amine formulations: treat stumps at the time of cutting.
Application Timing

- **Weed control**
  - Spring, after weeds have begun active growth until flower buds form
  - Fall when moisture conditions favor late season regrowth and rosette formation, prior to killing frost

- **Brush Control**
  - Foliar: after full leaf-out in the spring through summer until 10% leaf coloration
  - Cut surface: year ‘round except during spring sap flow
  - Basal: year ‘round except on wet stems
THANK YOU!

Contact Information
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