NUFARM PRODUCT GUIDE
2018 ORNAMENTAL EDITION

Nufarm is dedicated to promoting healthy growth for your plants and your business. Our insecticide, herbicide, and fungicide solutions deliver results that help ensure your long-term success.
DiPel® 2X DF, a leading biological insecticide in the world, provides growers with a high potency resistance management tool for proven control of Lepidoptera pests. Plus, DiPel is approved for organic production and safe to beneficial insects.

**KEY BENEFITS**
- Most potent Bt insecticide on the market and unique mode of action making it an excellent tool for managing resistance
- Immediately deters insects from feeding – death occurs within 1–3 days
- Dry flowable formulation is convenient, easy to handle, and highly tank mixable
- Not harmful to bees or beneficial insects making it a great tool for spring feeding caterpillars
- Zero pre-harvest interval (PHI) and no re-entry interval (REI), safe for humans

<table>
<thead>
<tr>
<th>GREENHOUSE CROP</th>
<th>INSECTS CONTROLLED</th>
<th>APPLICATION RATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>greenhouse ornamentals and herbs</td>
<td>Duponchelia fovealis</td>
<td>625 g/1000 L</td>
</tr>
<tr>
<td>roses</td>
<td>omnivorous leafroller</td>
<td>250 g/400 L</td>
</tr>
<tr>
<td>chrysanthemums</td>
<td>spruce budworm, gypsy moth, bagworm</td>
<td>125-250 g/400 L</td>
</tr>
<tr>
<td>ornamental and shade trees</td>
<td>spring and fall cankerworm, fall webworm</td>
<td>125 g/400 L</td>
</tr>
<tr>
<td></td>
<td>elm spanworm</td>
<td>250 g/400 L</td>
</tr>
<tr>
<td></td>
<td>tent caterpillar</td>
<td>65-125 g/400 L</td>
</tr>
<tr>
<td>sea buckthorn</td>
<td>gypsy moth</td>
<td>125-250 g/400 L</td>
</tr>
</tbody>
</table>

**Xentari**® WG

Xentari® WG is the only biological insecticide containing a natural, potent strain (ABTS-1857) of the microorganism *Bacillus thuringiensis* subspecies aizawai (Bta). Xentari® WG combats corn earworms, beet armyworms, and tomato loopers on ornamentals grown in outdoor and greenhouse settings.

**KEY BENEFITS**
- Preventive control of devastating insect pests
- Zero pre-harvest interval (PHI) – Xentari may be applied up to the day of harvest
- A good rotation partner with DiPel or other insecticides for resistance management
- Dust-free water-dispersible granule formulation

<table>
<thead>
<tr>
<th>GREENHOUSE CROP</th>
<th>INSECTS CONTROLLED</th>
<th>APPLICATION RATES</th>
<th>INTERVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>outdoor and greenhouse ornamentals</td>
<td>corn earworm, beet armyworm, tomato looper</td>
<td>750-1000 g/ha</td>
<td>3-14 days as needed</td>
</tr>
</tbody>
</table>
**AFFIRM™ WDG**

**A PROVEN LEADER IS NOW AVAILABLE IN CANADA.**

Affirm™ WDG Fungicide is a concentrated, easy-to-mix water-dispersible granule formulation. With a unique mode of action, it works through contact and translaminar activity to deliver excellent Botrytis blight and grey mould control.

**KEY BENEFITS**
- Controls Botrytis blight and suppresses grey mould in outdoor-grown ornamentals
- Unique FRAC 19 offers a new tool for disease resistance management
- Works up to 14 days through contact and translaminar activity
- Tank mix compatible with most commonly used pesticides

**APPLICATION / SEASON**
- three

**SURFACTANT NEEDED**
- no

**KEY USES**
- outdoor-grown ornamentals

**APPLICATION NOTES**
- Apply as a foliar spray, provide thorough coverage of foliage (and flowers when present) with minimal runoff.
- Begin as a preventive application when conditions favour disease development and continue on a 7-14 day interval as needed to maintain suppression.
- Do not apply more than 3 applications per season.
- Not for use in greenhouses.

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**BOTECTOR®**

**FIGHT GREY MOULD WITH BIOLOGICAL POWER.**

Protect your greenhouse and outdoor ornamentals from emergence to harvest with Botector® Biological Fungicide. Botector suppresses grey mould on many crops including chrysanthemums, hydrangeas, poinsettias, and roses.

**KEY BENEFITS**
- Protects 24 ornamental crops
- Delivers effective preventive control of grey mould under low to moderate disease pressure
- May be applied weekly as needed
- Labelled for use throughout the entire growing season (from emergence/transplant up to one week prior to harvest)
- The active ingredient, *Aureobasidium pullulans*, may be compatible with certain commonly used pesticides
- May be applied as a foliar spray alone or in alternating spray programs with other registered crop protection products

**APPLICATION / SEASON**
- three

**SURFACTANT NEEDED**
- no

**KEY USES**
- outdoor- and greenhouse-grown ornamentals

**APPLICATION NOTES**
- Begin preventive applications soon after emergence or transplant if climate conditions are favourable for infection as well as at first sign of disease onset. Repeat as needed on a 7-day interval up to harvest. Preferably apply in the morning or evening hours and during cool temperatures.
PRESIDIO®
POWERFUL PROTECTION WITH LOW-USE RATES.

Presidio® Fungicide, a unique class of chemistry (FRAC 43), offers growers a low-use rate resistance management tool that combats tough downy mildew and Phytophthora crown and root rot diseases. Fluopicolide, the active ingredient in Presidio, protects outdoor and greenhouse ornamentals through locally systemic and translaminar activity.

KEY BENEFITS
• Preventive with some curative reach-back activity
• Systemic and translaminar movement throughout the plant
• Highly tank mixable

KEY USES
- outdoor- (field and container grown, bedding plants and cut flowers) and greenhouse-grown ornamentals

APPLICATION / SEASON
- outdoor: two greenhouse: one

SURFACTANT NEEDED
- no

DISEASES CONTROLLED
- OUTDOOR FIELD AND CONTAINER GROWN BEDDING PLANTS AND CUT FLOWERS: downy mildew, Phytophthora crown and root rot
- GREENHOUSE ORNAMENTALS: downy mildew

APPLICATION RATES
- FOLIAR: 60–119 mL /ha
- DRENCH: 292 mL /ha

APPLICATION NOTES
- FOLIAR: Apply the spray solution to all plant surfaces and to the point of runoff.
- DRENCH: Use enough solution to wet the root zone of plants.
- Make foliar or drench applications on a 14–28 day schedule beginning when disease conditions are favourable, but prior to disease development.
- For resistance management, Presidio Fungicide must be used in a tank mix with a labelled rate of another fungicide registered for the target pathogen, but with a different mode of action. Apply Presidio Fungicide in a tank mix with ALIETTE®. Follow the most restrictive use directions of either label.
- PHYTOPHTHORA: For resistance management, Presidio Fungicide must be tank-mixed with a labelled rate of another fungicide registered for the target pathogen, but with a different mode of action. Apply Presidio Fungicide in a tank mix with ALIETTE®. Follow the most restrictive use directions of either label.
- Application should be made prior to disease development.
- Make foliar or drench applications on a 14–28 day schedule beginning when disease conditions are favourable, but prior to disease development.
- For resistance management, Presidio Fungicide must be used in a tank mix with TORRENTE® 400SC Agricultural Fungicide, or another registered alternative from a different fungicide group that is effective against the target pest.

PCP NO. 30051 FRAC NO. 43
ACTIVE INGR. fluopicolide (39.5%) FORMULATION suspension concentrate
CHEM. FAMILY benzamides PACKAGE SIZE 12 x 946 mL case
RAINFAST 2 hours

DOWNY MILDEW ON ROSE
Downy mildew is caused by a fungus-like water mould (Pseudoperonospora cubensis) and is a serious disease that can affect many ornamental crops in Canada. As an obligate parasite it requires a living host to infect. Once established in a region the disease can spread rapidly.

Symptoms first appear as small yellow spots on the topside of older leaves. The yellow spots sometimes take on a “greasy” appearance. The center of the lesion will eventually turn tan or brown and die.

Downy mildew primarily over-winters in the southern United States, Mexico, and in greenhouses where susceptible crops are grown year-round – yet it can travel incredible distances. The inoculum builds up on susceptible hosts in the spring. Sporangia are carried by air currents and storms. Sporangia may survive for several days before being deposited on susceptible ornamental crops. Once the disease becomes established, sporangia are disseminated from plant to plant. Primary spread is caused by splashing rains, overhead irrigation and moist air currents. Secondary spread is caused by insects, tools, equipment, the clothing of workers and through the handling of infected plants.

Photo: Jean L. Williams-Woodward, University of Georgia, Bugwood.org

PHYTOPHTHORA ON FRASER FIR IN NURSERY
Phytophthora rot root is one of the most devastating diseases to field- and container-grown ornamentals – especially to woody ornamentals. When the environmental conditions are favourable, Phytophthora develops very rapidly. Infection occurs when soils are wet and warm (20–30°C). The disease is associated with heavy rainfall, excessive irrigation, and/or poorly drained soil. Frequent, heavy irrigation increases the chance of disease.

Phytophthora root rot decreases the root volume, preventing water and nutrient absorption by the plant. Plant roots often become brittle and turn brownish in color. Wilting is a common symptom as the disease progresses to the plant crown. Initial symptoms include a sudden permanent wilt of infected plants that remain green. The wilt progresses from the base to the ends, before the plant eventually dies.

Resting Phytophthora fungi (chlamydospores and oospores) can survive in diseased roots, crowns, and crop debris in which it then spreads into the soil or potting media to infect new plants. Oospores germinate directly and infect plants or produce sporangia and zoospores. Zoospores are formed and released when the sporangia become saturated in water. Splashing and runoff water are common culprits for spreading Phytophthora. Zoospores may swim for several hours and infect plant tissues.

Photo: USDA Forest Service , USDA Forest Service, Bugwood.org
SUCCESSFUL WEED CONTROL IN NURSERY ORNAMENTAL PRODUCTION BEGINS WITH TIMELY WEED CONTROL APPLICATIONS. A PRE-EMERGENT APPLICATION OF BROADSTAR® ON ESTABLISHED ORNAMENTALS WILL HELP KEEP CONTAINERS WEED FREE. BROADSTAR’S NOVEL MODE OF ACTION (FLUMIOXAZIN) OFFERS AN EXCELLENT RESISTANCE MANAGEMENT TOOL TO MAXIMIZE THE EFFICACY OF YOUR GRANULAR HERBICIDE PROGRAM.

**KEY BENEFITS**
- Proven pre-emergent weed control that saves costly hand weeding
- Long-lasting residual control – from 8 to 12 weeks – depending on rate
- Broad-spectrum control of tough broadleaf weeds
- Quality formulation means no dust and more consistent product release
- Odorless, doesn’t stain and is not volatile
- Excellent crop safety (when used as per label), does not inhibit root growth

**PRODUCT INFORMATION**
- **PCP NO.** 29229
- **WSSA GROUP** 14
- **ACTIVE INGREDIENT** flumioxazin (0.25%)
- **FORMULATION** granule
- **CHEM. FAMILY** N-phenylphthalimide
- **PACKAGE SIZE** 22.7 kg bag
- **RAINFAST** adequate moisture needed for activation, avoid application when heavy rain is forecast

**APPLICATION / SEASON**
- Two

**SURFACTANT NEEDED**
- No

**KEY USES**
- Outdoor container-grown woody ornamentals

**APPLICATION NOTES**
- For optimal pre-emergence control, apply before weed seeds germinate. Disturbing soil surfaces after application may reduce herbicide efficacy.
- Approximately 1-2 cm of rainfall, overhead sprinkler irrigation or hand irrigation is required to activate. Irrigate plants immediately after application (within one hour). Drip irrigation cannot be relied upon to ensure activation.

**TOLERANT TREE SPECIES**
- Amur maple
- Blue spruce
- Eastern white cedar
- Japanese maple
- Red oak
- White spruce
- Yew

**TOLERANT SHRUB AND COVER SPECIES**
- Boxwood tree
- Creeping juniper
- Sabin juniper

**SEE THE RESULTS IN CONTAINER-GROWN ORNAMENTALS >> LIVERWORT AND BITTERCRESS WEED CONTROL**

**LEFT CONTAINER:** Liverwort control using BroadStar
**RIGHT CONTAINER:** Untreated

**LEFT CONTAINER:** Untreated
**RIGHT CONTAINER:** Bittercress control using BroadStar

**KEEP WOODY ORNAMENTALS WEED-FREE**

Once applied and activated by rain or irrigation, BroadStar forms a herbicide layer on the soil surface. As weeds germinate they come in contact with the herbicide layer and sunlight exposure which disrupts cell membranes and causes seedling death.

**TOLERANT TREE SPECIES**
- Amur maple
- Blue spruce
- Eastern white cedar
- Japanese maple
- Red oak
- White spruce
- Yew

**TOLERANT SHRUB AND COVER SPECIES**
- Boxwood tree
- Creeping juniper
- Sabin juniper
SUREGUARD®
KEEP FIELD-GROWN ORNAMENTALS WEED FREE.

SureGuard® provides outstanding weed-free trees and shrubs in ornamental beds. With long-lasting, pre-emergent control of tough annual broadleaf and grassy weeds, SureGuard is your sure choice for weed control made easy.

**KEY BENEFITS**
- Long-lasting, pre-emergent control of annual broadleaf weeds and grasses
- Low water solubility for long residual control of tough weeds in a nursery setting
- Binds tightly to soil to reduce runoff
- Novel mode of action supports resistance weed management strategies
- Proven pre-emergent weed control that saves costly hand weeding
- Broad spectrum control of tough broadleaf weeds
- Excellent crop safety (when used as per label)
- When tank mixed with glyphosate, provides superior knockdown and long residual even on glyphosate resistant weeds

### WEEDS CONTROLLED

<table>
<thead>
<tr>
<th>WEEDS CONTROLLED</th>
<th>APPLICATION RATES</th>
<th>APPLICATION NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada fleabane, dandelion, Eastern black nightshade, green foxtail, hairy nightshade, kochia, lamb’s quarters (common), pigweed (green, redroot), ragweed (common)</td>
<td>COARSE-TEXTURE SOIL: 280 g/ha</td>
<td>PRE-EMERGENCE: Apply prior to weed emergence. POST-EMERGENCE: When weeds are already emerged, apply as a tank mix with glyphosate product, present as isopropyl amine or potassium salt, at 1.2 kg a.i./ha. Apply only as a directed, shielded or hooded spray to established trees. Moisture is necessary to activate SureGuard Herbicide in soil for residual weed control. When adequate moisture is not received after application, weed control may be improved by irrigation with at least 1/2–1 cm of water.</td>
</tr>
<tr>
<td></td>
<td>MEDIUM-TEXTURE SOIL: 420 g/ha</td>
<td></td>
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</tbody>
</table>

**APPLICATION / SEASON**: two

**SURFACTANT NEEDED**: as needed

**KEY USES**: outdoor field-grown ornamentals, bare ground non-crop areas

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Once applied and activated by rain or irrigation, SureGuard forms a herbicide layer on the soil surface. As weeds germinate they come in contact with the herbicide layer and sunlight exposure which disrupts cell membranes and causes seedling death.

**TOLERANT CONIFEROUS TREE SPECIES**
- Balsam fir
- Blue spruce
- Douglas fir
- Eastern white cedar
- Fraser fir

**TOLERANT DECIDUOUS TREE SPECIES**
- Green ash
- Japanese lilac
- Norway maple*

*not for use on maple trees used for maple syrup production
With both potassium and IPA salts, Credit® Xtreme is the only glyphosate product to offer Dual Salt Technology™. The rapid uptake leads to quicker activity and rainfastness. Credit Xtreme has an acid equivalent content of 540 g/l glyphosate and treats 50% more acres than many products which only have 360 g/l a.e.

**KEY BENEFITS**
- Contains proprietary Dual Salt Technology™
- Takes on the toughest weeds with quick burndown and complete control
- Excellent tank-mix compatibility, even in hard water environments
- Fast translocation activity and rainfastness
- Treats more acres per case or tote than many alternative glyphosate products

**CREDIT XTREME CONTROLS MANY ANNUAL AND PERENNIAL WEEDS AND WOODY BRUSH AND TREES**

**SEE PRODUCT LABEL FOR COMPLETE LIST, APPLICATION RATES AND USE DIRECTIONS**
- Apply to small actively growing weeds
- Apply in clean water
- Do not apply in hard water (use a softener such as AMS)
- Applications to weeds under stress may not provide acceptable control
- In high pH situations (6 or above) an acidifying agent is recommended

**TO SELECT THE BEST GLYPHOSATE, READ BEYOND THE ACTIVE INGREDIENT**

**GLYPHOSATE IS GLYPHOSATE, BUT SALTS ARE NOT THE SAME**
Not all glyphosate formulations are created equal, and just comparing the percentage of active ingredient is not enough to make an informed decision.

The active ingredient – the stuff that kills the weed – in any glyphosate formulation is the glyphosate acid, and all glyphosate acid is the same. But in order to work more effectively as a herbicide, glyphosate acid is formulated with a variety of other chemicals to form salts. Those salts are then mixed with carriers and surfactants to form the herbicide.

On the product label, the percent of active ingredient refers to the percentage of the total that is made up of glyphosate salts. Because the molecular weight of the salts varies widely, herbicides using different salts may have active ingredient percentages that differ, even though the net amount of glyphosate remains the same. So a product that contains 34% active ingredient and uses mixed salts contains the same amount of glyphosate – and thus the same weed-killing power – as an IPA salt (the most common post-patent formulation) labeled as containing 41% active ingredient.

**LOOK FOR THE A.E., NOT THE A.I.**
While this may appear confusing, there's actually an easy way to sort it out: the acid equivalent. This is often listed on product labels and in sales literature, and it is the quickest way to determine the amount of glyphosate you're actually buying.
GROWING BETTER
SINCE 1916

More than 100 years ago, our history began with a goal to help New Zealand’s farmers. From New Zealand, we have grown to serve more than 100 countries worldwide. Today, our founders’ passion to help growers through quality solutions and unparalleled customer service remains at the heart of everything we do.

100 YEARS AND STILL GROWING