



HORT MATTERS

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Emergency Registration of Intercept 60 WP Greenhouse Insecticide for Swede Midge Control in Greenhouse Brassica Transplants

Jennifer Allen , Vegetable Crop Specialist, OMAFRA
Jim Chaput, Provincial Minor Use Coordinator, OMAFRA

The Pest Management Regulatory Agency has granted an emergency registration from April 1 until September 30, 2008 of Intercept 60 WP (imidacloprid) Greenhouse Insecticide as a transplant tray plug drench for control of swede midge on brassica transplants including broccoli, Brussels sprouts, cabbage, cauliflower, kale, mustards and a variety of speciality brassicas (e.g. Chinese cabbage, Chinese broccoli etc.).

Intercept 60 WP Greenhouse Insecticide can be applied at a rate of 4.1 g product per 1000 seedlings in a minimum of 15 L solution per 100 m² of seedling trays. The product should be applied at least 10 days before transplant to ensure sufficient uptake by the seedling roots. Apply only once per crop season and observe a pre-harvest interval of at least 21 days. Remember to use this product in conjunction with an integrated pest management program.

We wish to thank the Ontario Fruit and Vegetable Growers Association and Fédération des producteurs maraîchers du Québec, joint sponsors of this emergency registration. We would also like to thank Bayer CropScience Inc. for their support of this registration.

For copies of the emergency use label, contact Jim Chaput, Provincial Minor Use Coordinator 519. 826.3539 or Bayer CropScience Inc. 1.888.283.6847.

Quick Fixes for Eroded Fields

Anne Verhallen, Soil Management Specialist, (Hort. Crops), OMAFRA

Winter rain and rapid snow melt has left a lot of fields with visibly eroded areas. These need to be fixed and erosion prevented before crop seeding. Rills and other small eroded areas can usually be filled in with tillage but the soil surface needs to be stabilized either with a fast growing cover crop like oats or with residue. The key with residue is to anchor it or pick a material that is heavy enough to stay in place during thunderstorms and other downpours. Covering the repaired area with straw or corn stalks and strategically placing a series of straw bales may help to prevent further erosion during that vulnerable period as the crop establishes.

For the future, consider why the erosion occurred in that area. Would reduced tillage or cover crops prevent it in the future? Small rills and other simple erosion may seem to be insignificant but you are losing valuable soil and fertility not to mention the time and effort to repair the damage.



The OMAFRA Soil Test Lab Accreditation Program provides increased value to Ontario farmers

Keith Reid, Soil Fertility Specialist, OMAFRA

Soil test accreditation provides assurance to the farmers of Ontario, and to the public, that soil test labs are providing accurate analytical results to farmers. This provides the basis for responsible management of nutrients on agricultural land, so that applications of fertilizers and manure are both agronomically and environmentally sound. Accreditation covers soil tests for nitrate nitrogen, plant available phosphorus (sodium bicarbonate extractable), plant available potassium and magnesium (ammonium acetate extractable), zinc and manganese indexes, and soil pH and buffer pH.

To be accredited, labs must demonstrate that they can correctly analyze a series of nine samples over three months, and then continue to provide the correct analyses on quarterly exchange samples. In addition, they must have an acceptable internal quality control system, as well as adequate facilities and equipment to handle and analyze samples.

Accreditation does not cover the fertilizer recommendations made by agronomists working for the lab. However, with the accredited test you can use the tables in OMAFRA publications to determine your own fertilizer recommendations, if you so wish.

Forest Resources and Soil Testing (FoReST) Laboratory of Lakehead University, Thunder Bay, has met the requirements of the OMAFRA Soil Test Lab Accreditation Program, and joins the six soil test laboratories that are currently accredited by OMAFRA: Accutest Labs in Nepean; Agrifood Labs in Guelph; A&L Canada Laboratories in London; Brookside Laboratories in New Knoxville, Ohio; Stratford Agri Analysis in Stratford; and University of Guelph Laboratory Services. Contact information for each of these labs follows.

For further information, contact Keith Reid (519-271-9269 or email keith.reid@ontario.ca)

Accredited Labs in Ontario

A & L Canada Laboratories East, Inc.

2136 Jetstream Road
LONDON, Ontario N5V 3P5
Telephone: 519-457-2575 Fax: 519-457-2664
Contact: Mr. Greg Patterson/Ian McLachlin
Email: aginfo@al-labs-can.com
Web Site: www.al-labs-can.com

Accutest Laboratories

146 Colonnade Road, Unit #8
NEPEAN, Ontario K2E 7Y1
Telephone: 613-727-5692 Fax: 613-727-5222
Contact: Mrs. Lorna Wilson
Email: lwilson@accutestlabs.com
Web site: www.accutestlabs.com

Agri-Food Laboratories

503 Imperial Road, Unit #1
GUELPH, Ontario N1H 6T9
Telephone: 519-837-1600, 1-800-265-7175 Fax: 519-837-1242
Contact: Mr. Dale Cowan
Email: lab@agtest.com
Web site: www.agtest.com

Brookside Laboratories, Inc.

301 South Main Street
NEW KNOXVILLE, Ohio 45871
Telephone: 419-753-2448 Fax: 419-753-2949
Contact: Ms. Nicole Fisher, Mr. Mark Flock
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Forest Resource & Soil Testing (FoReST) Laboratory

Lakehead University Centre for Analytical Services
955 Oliver Road
THUNDER BAY, Ontario P7B 5E1
Telephone: 807-343-8639
Contact: Mr. Joel Symonds
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Stratford Agri Analysis Inc.

1131 Erie St., Box 760
STRATFORD, Ontario N5A 6W1
Telephone: 519-273-4411, 1-800-323-9089 Fax: 519-273-2163
Contact: Mr. Dale Peters/Mr. Keith Lemp
Email: laboratory@daconutrition.com

University of Guelph Laboratory Services,

P.O.Box 3650, 95 Stone Road West
GUELPH, Ontario N1H 8J7
Contact: Mr. Nick Schrier
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Oil Sprays for Early Season Management of Scale, Mites, & Psylla

Hannah Fraser, Entomology Program Lead – Hort Crops, OMAFRA

In terms of the weather, it appears that we're off to a bit of a late start in 2008. The days are starting to warm up, however, and as temperatures increase, insect activity will resume. For tree fruit growers, we are approaching a critical time for early season management of pear psylla, European red mites and scale insects. Oil sprays are excellent tools for managing these pests, but timing is important to achieve good control. Understanding the biology of these pests as well as how oil sprays work will help to optimize control applications and avoid tissue damage.

To avoid potentially serious phytotoxic effects, oil should not be used within 48 hours of below freezing temperatures (tricky at this time of year) or within 10-14 days of some fungicides including Bravo or Maestro / Captan. Kumulus (sulphur) should not be applied within 30 days of an oil spray. Oil may cause bark injury on some varieties of apple, notably Red Delicious, Empire and Mutsu. Refer to product labels for specific warnings and read Publication 360 for crop-specific information.

Oil sprays have a physical mode of action. They work by suffocation, by discouraging females from laying eggs, and / or by preventing settling of scale crawlers. High water volumes are essential for good coverage. The use of Superior Oil for early season management can sufficiently reduce European red mite and scale populations such that no additional miticides or insecticides need be applied for these pests; experience has shown that a single well-timed oil application every two to three years can maintain numbers below action thresholds (but keep monitoring!). Early season use of oils is considered an IPM friendly tactic because the product is applied before predatory mites and other beneficial insects are present in the tree canopy.

European red mites overwinter as eggs. They begin to hatch at tight cluster in apple, just prior to bloom in pear, and during the bloom period in peach. Oil sprays should be applied before these eggs hatch, between half-inch green and tight cluster in apple, at green tip in pear and prebloom (half-inch green to first pink) in peach.

There are several species of scale insects affecting tree fruit; San Jose scale is considered the most common and damaging in Ontario orchards. This insect overwinters as a first instar nymph under bark scales and emerges just prior to bud break in apple. As the nymphs feed, they exude a waxy substance

that forms a protective layer. Dormant oil sprays are recommended, before the protective waxy layer develops around the scale nymph.

Pear psylla overwinter as adults under bark crevices on the host tree. When temperatures increase in late March and early April, they will move from protected areas and begin to lay eggs. Most eggs are laid before bud break. Oils smother eggs, but they also act as repellents and keep female psylla from laying eggs. Once the oils break down, females will lay their eggs over a short time period. This results in a synchronous first generation of nymphs. A synchronous population composed of early stage nymphs is easier to control with insecticides than one made up of various life stages. Recommended timing is during the dormant period.

Unfortunately, it is evident optimal timing for one pest is not necessarily the same for others. If monitoring indicates scale or pear psylla is a bigger issue in the orchard, oils need to be applied earlier, during the dormant period. If ERM populations are problematic, growers may wish to hold back on sprays into the green tip (pear) / half-inch green to tight cluster (apple) / prebloom (peach) period. The good news is that in a well-managed orchard oil sprays are not usually required each year, so one approach might be to alternate the timing of application on a two year cycle.

For more detailed information on crop-specific timing of oils, see Publication 360: Fruit Production Recommendations 2008-2009 – hot off the press and available for sale.

Managing Phytophthora Blight on Peppers

Michael Celetti – Plant Pathologist-Horticulture Crops Program Lead, OMAFRA

Phytophthora blight of peppers has finally reared its ugly head in south western Ontario. This devastating disease has probably been around for many years but only recently has it become severe enough in a few peppers fields that some growers are starting to take notice. It has caused significant damage to peppers and cucumbers in many US states including the neighbouring states of Michigan and New York. The pathogen, *Phytophthora capsici*, can also infect many other crops including tomatoes, eggplant, melons, summer squash and beans, however, peppers and cucumbers are considered to be most susceptible. It is very difficult to manage this disease once the pathogen becomes established in a field. Understanding the biology of *P. capsici* and early identification of disease symptoms will help pepper growers to implement an early management strategy to reduce the impact of this disease.

Phytophthora spp. belongs to a group of organisms sometimes referred to as "water molds" although they are not technically molds. It survives as persistent oospores (sexual resting spores) in soil and plant debris for long periods. When infested soils become saturate, these persistent resting spores germinate and infect roots and crowns of pepper plants. Severe root and crown rot restricts the movement of water and nutrients up into the plant resulting in wilting and eventually death of infected plants (Figure 1). The persistent oospores in soil can also germinate to produce microscopic sac-like structures called sporangia. When soils become saturated for a sustained period of time, these sporangium releases another type of spore called zoospores that have tails allowing them to swim toward and infect the roots and crowns of pepper plants. This why the disease often occurs first in low lying areas of the field where soils remain saturated for longer periods of time. The sporangia can also act similar to spores since they are easily dislodged and rain splashed to leaves and stems. Symptoms on leaves appear as a greyish-brown water soaked lesion (Figure 2) and on stems as a distinctive dark brown to black lesion (Figure 3). Fruit can also become infected and appear to be cover with a white whisker-like fuzz. The appearance of symptoms on above ground plant parts usually occurs in close proximity to plants with severe root and crown rot. Any technique that reduces water splashing from the rots crowns and soil onto leaves, stems and fruit will also reduce disease of above ground plant tissue. Planting transplants into stubble left from a cover crop or applying straw mulch around plants has been shown to effectively reduce many diseases that spread through rain splashing including *P. capsici*

Managing Phytophthora Blight in peppers is challenging in severely infested fields. Due to the persistence of the resting spores in soil, crop rotation is not a viable option in fields that become severely infested. Although there are several fungicides registered in the US that help manage Phytophthora blight in peppers, none are registered for this disease in Canada. Fungicides are currently being evaluated by Agriculture and AgriFood Canada. Regardless, effective management of this disease must not only include



Figure 1. Root and crown rot symptoms on a bell pepper plant infected with *P. capsici*.



Figure 2. Lesion on bell pepper leaf.



Figure 3. Lesion on bell pepper stem.

fungicides when necessary, but also other cultural methods integrated into a disease management strategy.

Selecting a well drained field to grow peppers is important since the disease is often not as severe in fields with good drainage. Planting pepper transplants on raised beds (>23 cm high) helps to drain water away from roots and crowns of plants, prevents water from accumulating around the base of plants resulting in less disease. It is also important that no ridges or depressions are left on raised beds where water can puddle. Similarly, growers who use plastic mulch over their beds must insure that there is no depression around the base of transplants where water can accumulate and that beds are crown shaped to allow water to drain away from the base of plants.

Frequency and duration of irrigation during dry periods can influence the severity of disease. Research has shown that although saturate soil are a prerequisite for oospore germination and root infection, plants growing in soil with cyclical periods of saturation alternated with drier conditions are often more severely diseased than in continuously

saturated soil. By scheduling irrigation to maintain soil moisture constantly below saturation and irrigate fields less frequently helps to reduce disease severity. One research studied showed that by placing drip irrigation emitters 15 cm below the soil surface forced the pepper roots to grow down deeper into the soil seeking moisture and did not allow the condition near the soil surface to become wet enough to allow oospore germination. As a result, less disease was found in plots with the deeper emitters.

Since *P. capsici* is a “water mold”, it is also important to keep irrigation ponds free of this pathogen. Irrigation ponds that are close to infested fields can become contaminated particularly if surface and subsurface water from contaminated fields drains into the pond. Irrigating peppers or any susceptible crop with *P. capsici* contaminated water source will most likely result in severe disease. Filtering irrigation water can remove some of the pathogen from contaminated water but it is best to avoid contamination by locating ponds away from infected field if possible.

What do Zebra Mussels have to do with Phosphorus?

Donna Speranzini, Nutrient Management Planning Lead (Hort), OMAFRA

We are starting to hear more and more talk about phosphorus management. Phosphorus occurs naturally in many different forms in the environment.

In the soil it becomes a nutrient essential for the growth of plants. Ontario soils contain a lot of phosphorus, as much as 2,000 lbs per acre. Most of this phosphorus is fixed in soil particles and is unavailable for plant growth. Wind and water erosion have the ability to move particulate phosphorus into water courses.

In the water phosphorus is considered a limiting nutrient. The addition of phosphorus will cause increased growth of water plants and algae. This increased growth removes dissolved oxygen from the water making it unavailable to fish.

Phosphorus levels in the Great Lakes have decreased significantly over time, from highs around 12 ug/l in the early 80's to today's level of between 4 and 6 ug/L. This decrease can be partially attributed to increased soil erosion management on farms, improved sewage treatment and reduced phosphates in detergents. So why is phosphorus loading still an issue in the Great Lakes?

In two words, Zebra Mussels.

Mussels are filter feeders meaning they take in particulates and strip them of their nutrients. The mussels have been taking bound phosphorus and releasing it as soluble phosphorus in the near shore areas of the lake. This excess of soluble phosphorus has led to an excess of aquatic plant growth in the near shore areas. The plants interfere with boating, get caught in anglers lines, and detract from the recreational swimming experience. Some municipalities have incurred great expense to remove this excessive plant growth.

Some of these nuisances have refocused the attention back to phosphorus loading into streams, tributaries and eventually the lakes. There are several contributors of phosphorus into the lakes, only one of which is agriculture. The others include construction, sewage treatment plant discharge and overflows, storm water run-off from urban areas and septic systems.

These multiple source however will not take away continued pressure on farmers to reduce wind and soil erosion. Fortunately there is a large suite of management practices available to producers. These include soil testing, vegetated buffer strips, windbreaks, grassed waterways, sediment control basins, stream bank stabilization and cover crops. With a history of successfully implementing these practices, farmers are well positioned in a society that is once again focusing on phosphorus management.

Key Issues for managing apple scab in 2008

Kathryn Carter, Pome Fruit IPM Specialist, OMAFRA
Wendy McFadden-Smith, Tender Fruit and Grape IPM Specialist, OMAFRA

Even if your crop didn't have significant scab at harvest, it's still possible to have a high inoculum load for the following spring. This is because the fungus that causes apple scab, *Venturia inaequalis*, continues to develop in the leaves after harvest if the post-harvest period is warm and wet, resulting in inoculum build up for the following spring. At the Ontario Fruit and Vegetable Convention (OFVC), Cathy McKay, a grower/consultant from Nature's Bounty, showed that, from the Ontario perspective, we have been seeing an increase in apple scab in recent years. Harvest assessments from the Northumberland Durham apple growers show that the amount of scab in orchards and the number of orchard blocks infected with scab at harvest have been increasing in recent years. I have also seen this trend across the province, to the extent that scab was even a problem last year in several orchards, despite the hot, dry conditions, which were not conducive to the spread of the disease. So what do growers need to remember when developing a scab management program in 2008?

Fungicide resistance

Resistance is not a concern for mancozeb, polyram, captan, ferbam, thiram, sulphur or copper. For all other apple fungicides (Nova, Nustar, Sovran, Flint, Scala) resistance has already developed or can be expected to develop. New York and Michigan have documented resistance to sterol inhibitors (SI's) such as Nustar and Nova. Research conducted by Dr. Wolfram Koeller of Cornell University estimates that resistance to SI's can occur after approximately 60 applications. This assumes label rates, complete coverage and no extended spray intervals. If any of these are compromised, so is the "life" of the fungicide. There is also some evidence that shows that resistance to strobilurins such as Sovran and Flint is developing in some areas. Research conducted by Dr. Wendy McFadden-Smith in 2006-2007 in Ontario found that SI resistance is starting to appear in a few Ontario orchards that have been reporting field failures in managing apple scab. Unfortunately resistance in apple scab is not reversible and the resistance to fungicides lasts forever. To prevent the development of fungicide resistance never use fungicides as eradicants, it is better to apply products preventatively. If you do get caught with an infection period, go in as soon as possible after infection: do not rely on 96-hr kick-back activity. If scab appears in your orchard, don't try to "burn it out" as that strategy will only encourage the development of scab resistance. Instead rely on the use of protectants to prevent the spread of the disease. Always use a ½ rate EBDC fungicide with SI insecticides, and don't use SI's before tight cluster or after fruit are present on the tree.

Fungicide Timing

While the majority of ascospores are released during bloom, some are present and ready to infect green tissue as soon as it emerges. Dr. David Rosenberger of the Hudson Valley Lab, Cornell University, has shown that the risk of economic loss from a scab control failure is highest at green tip. These green tip infections produce conidia at bloom when the fruit and leaves are the most susceptible to scab. If leaves and fruit are infected early in the season, there are more scab generations of scab before the summer heat shuts down the scab epidemic, resulting in increased damage to the crop. Early season scab infections (blossoms, and leaves) often causes secondary infections on fruit. As a result the crop should be covered from silver tip or green tip. In New York a green tip copper spray is considered to be just as good as a mancozeb spray (3.5 kg/ha). During or after half-inch green mancozeb-captan combinations are frequently used (avoid using captan where oil has been used) at a rate of 3.5 kg/ha mancozeb plus 1 to 2 kg/ha captan/Maestro. The rationale behind this is that mancozeb has better retentiveness and rain-fastness than does captan. However, by virtue of that characteristic, captan may redistribute better to newly expanding leaves. In a very heavy rain, captan may disappear more quickly than mancozeb, whereas in repeated light rains the captan may provide better protection of new leaves via redistribution.

Alternate row spraying

Growers will often chose to use alternate row middle spraying as a means to reduce spray time early in the growing season. Skipping alternate rows will lead to a reduced degree of coverage but more rapid treatment of the orchard. In this case, spray the skipped middles as soon as possible after completing the first spray. Be wary of alternate row spraying on an extended interval. For good resistance management, it is imperative that all leaves be protected every 7 days. If you have been experiencing problems with scab control, it is a good idea to spray every row to ensure good coverage and protection from early-season infections. Do not use alternate row spraying for SI's or strobilurins.

High inoculum orchards

Another important component of managing scab is reducing primary inoculum. In research trials conducted by Dr. Bill MacHardy's lab at the University of New Hampshire, urea (45 kg of agricultural urea per 1000 L of water/ha) was applied to the orchard floor after about 95% of the leaves had fallen (November) or in the spring (April) before bud break. The urea works in two ways: it directly inhibits the

development of ascospores and it stimulates the growth of naturally occurring organisms that are antagonistic against *V. inaequalis*. Both treatments reduced the number of ascospores, but the spring treatment was more effective and resulted in fewer leaf and fruit infections in most years. In the years when it didn't work, the snow cover remained almost until bud break so there was not a lot of time for the urea to work.

Some growers have expressed concerns about applying N to trees as they are going into dormancy. Dr. Wendy McFadden-Smith did a trial in which shoots from trees treated sprayed with urea in late October and those that were not treated were frozen to temperatures as low as -40 C in a freezer. There was no difference in the cold-hardiness of buds from trees treated with urea. Donna Speranzini, Nutrient Management Planning Specialist with OMAFRA, also does not think that this small amount of N will cause excessive growth.

In summary, the best way of managing scab in your orchard is to prevent infection in the first place.

- Use urea ground sprays to reduce inoculum in orchards with high scab pressure.
- Start your spray program no later than green tip.
- Use SI (Nova, Nustar) and strobilurins (Flint, Sovran) conservatively -- no more than 2 sprays per group per year.
- Do not rely on post infection spraying
- Use full label rates and get complete coverage.
- Maintain tight spray intervals from green tip through petal fall.

Incorporating new products into Apple IPM spray programs

Kathryn Carter, Pome Fruit IPM specialist, OMAFRA

Now that we have so many options for managing pests in apple orchards, one of the biggest challenges is determining the best product to use at which timing. As you will notice from below there are a variety of different chemistries available to manage pests. The best way of determining which product to use, is based on what pests you have present in the orchard.

Whenever managing pests in the orchard it is important to use a resistance management strategy. Always use the same insecticide for each generation of insect, and rotate chemical families between generations of insects. Keep in mind that overuse of some products (ie. some neonicotinoids) may result in mite outbreaks.

Border spray programs of OP insecticides (Guthion, Imidan) have been shown to be effective in managing codling moth, apple maggot. Border spray programs include the use of an initial cover spray, followed by border sprays. Very little is known about the effectiveness of using other products (Calypso, Assail, Surround) as border sprays, and as a result they are not recommended at this time. Always check the label or your retail outlet to determine if the product should be applied using tree row volume. Tree row volume is not recommended for many of the newer products due to concerns with efficacy. On newer products, labels may indicate the minimum amount of product that must be applied when using tree row volume. Remember that some products that control codling moth do not have efficacy against apple maggot. Note that many of the newer insecticides do not have the same residual as OP insecticides, so an earlier re-application may be necessary to provide sufficient control. Also for some pests (codling moth), many of the newer insecticides should be applied slightly earlier than conventional products.

Table 1 Potential Apple IPM spray options

Timing	Pests controlled	Products
Petal fall	OFM/OBLR/TLM	Delegate ¹ , Altacor*, Intrepid
	OFM/OBLR/CM	Rimon
	PC/OFM/MB/TLM	Calypso ²
	OFM/TLM/Aphids	Assail ³
	PC/TLM/MB/RAA	Actara
	OBLR	Success, Dipel/Foray/Bioprotect
	PC	Imidan
Codling moth	CM/TLM	Intrepid/Confirm
	CM/TLM/aphids/MB/AM	Calypso, Assail
	CM/TLM	Delegate ¹
	CM/TLM	Altacor*
	CM/OFM/OBLR	Rimon (must be applied at petal fall)
	CM/AM	Imidan
	2 nd generation OBLR	OBLR/TLM
	OBLR/TLM	Altacor*
	OBLR/TLM	Intrepid
	OBLR	Rimon

¹ Also provides suppression of PC. Delegate applied for codling moth may provide some suppression of apple maggot.

² Calypso also has activity against Rosy apple aphid, as well as European Apple Sawfly although it is not registered for either of these pests.

³ Assail also has activity against MB. The application of Assail to control Codling moth will provide subsequent control of apple maggot.

*Please note that Altacor is not currently registered. Its registration is anticipated in 2008.

Legend

CM-codling moth, OFM-oriental fruit moth, PC-plum curculio, OBLR-oblique banded leafroller, TLM-tentiform leafminer, Aphids-aphids, MB-mullein bug, RAA-rosy apple aphid

Table 2 Activity of codling moth insecticides on other pests

Trade name	Japanese beetle	Apple maggot	Tentiform leafminer	leafhoppers	Aphids
Guthion/Imidan	excellent	excellent	poor	good (PLH only)	poor
Calypso/Assail	good	excellent	excellent	excellent	good
Rimon	poor	poor	?	poor	poor
Delegate	poor	suppression	good	poor	poor
Altacor	poor	suppression	good	poor	poor

Table 3 Residual Activity of insecticides

Product	Chemical name	family	Residual (days)*	Mite Flaring potential
Imidan	phosmet	OP	18-21	L-M
Intrepid	methoxyfenozide	IGR (MAC)	14+	L
Assail	acetamiprid	neonicotinoid	10-14	M
Calypso	thiacloprid	neonicotinoid	10-14	M
Rimon	novaluron	IGR (Chitin synthesis inhibitor)	14+	?
Altacor	rynaxypyr	Ryanodine receptors	14+	?
Delegate	spinetoram	naturalyte	14+	?
Success	spinosad	naturalyte	7-10	L

* Keep in mind the residual activity of insecticides is often dependent on the rate used, coverage, and weather conditions.