

Missouri Environment & Garden

August 2011

Volume 17, Number 8

Tree and Shrub Injury Symptoms in Lawns Treated With Imprelis Herbicide

Lawn care companies across the country have reported that some trees and shrubs near turf areas treated with a new broadleaf weed killer, Imprelis, showed browning



Figure 1 - White pines showing distortion and browning of branch tips.

Imprelis

Imprelis is a new herbicide, manufactured by DuPont and registered with U.S. Environmental Protection Agency in 2010. The active ingredient in Imprelis is aminocyclopyrachlor, which mimics auxin — a natural-growth regulator in plants. The product is intended for use by professional applicators only. According to the Imprelis product label, the herbicide is quickly taken up by leaves, stems and roots of a weed and is translocated throughout the plant. The product is highly effective in controlling problem weeds such as clover, ground ivy and violets. However, due to the potential for root uptake, the product label states, “particular care must be taken within the

dripline of trees and shrubs or other ornamental plants.” and dieback weeks after the application. Spruce and pine trees have been most severely damaged — some trees dying within 12 weeks of lawn treatment. Damage symptoms also have been observed on many other species of trees and shrubs.

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Symptoms

New growth on some white pines near Imprelis-treated turf has been observed to be twisted with needles and stems turning brown, especially on upper branches (Figures 1 and 2). In some cases, entire trees have turned brown. Spruce trees also have exhibited browning and dieback of tips with less stem twisting. Symptoms on other species of trees and shrubs are more subtle, with leaves cupping or twisting with little or no browning (Figure 3 on page 60).

Although it is not clear why trees and shrubs have shown damage symptoms following Imprelis application to lawns, the likely

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Figure 2 - White pines showing distortion and browning of branch tips.

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Figure 3. Cupping of leaves on a London Planetree.

drip lines, it appears that tree roots extending into turf areas took up the material, which was then translocated throughout the trees. In most cases, it is physically impossible to spray within the drip line of a spruce tree, since branches extend to the ground (Figure 4).

DuPont recommendations

DuPont recommends allowing trees that show symptoms of possible Imprelis injury to remain in the landscape for one year to see if they recover. Damaged plants should be watered during drought but not fertilized. DuPont recommends that new trees not be planted in areas treated with Imprelis during the same season the product was applied.

Until the situation is clarified, the manufacturer recommends that Imprelis not be sprayed near pine and spruce trees. If dead trees from a treated area are chipped, the chips should not be used as mulch. The Imprelis label also states that grass clippings from treated lawns should not be used for mulch or composting.

cause is unintended herbicide uptake by the roots of those trees and shrubs. Even in cases where lawn-care operators avoided spraying the herbicide within the

Contact information

Home owners who observe damage symptoms similar to those shown here after herbicide applications should contact their lawn care providers. Professional lawn-care applicators who observe adverse effects, should call Du-



Figure 4. A severely damaged spruce tree.

Pont at 888-638-7668 to give information regarding the application site and receive the latest information.

NOTE:

DuPont has made a hotline available as of August 1 to report suspected damage. The hotline number is 866-796-4783. You can find more facts about Imprelis at <http://www.imprelis-facts.com/>.

Chris Starbuck,
Associate Professor
Division of Plant Sciences
StarbuckC@missouri.edu

Lycoris: An August Surprise

By August, Missouri gardens usually show the “wear and tear” of a typical summer and the luster starts to wear off many plants that once were quite showy. Another four weeks of watering, weeding and insect control (while a part of gardening) is not a welcome thought for many. Just when there (seemingly) is little to look forward to in the gardening world, *Lycoris* makes its annual surprise appearance thus adding a bit of intrigue and beauty to our beleaguered gardens.

Lycoris squamigera, or surprise lily, is the most commonly grown *Lycoris* and is a member of the *Amaryllidaceae* family. Other names often used for this species include magic or resurrection lily. The genus *Lycoris* is named in honor of a Roman beauty (and mistress of Mark Anthony) famed for her intrigues. Presumably the name was chosen because of the disappearance of the leaves in

the spring followed by the reappearance of the flowers that spring from the ground in late summer/fall, which is an intriguing aspect of members of the genus.

The genus *Lycoris* contains over 15 species of plants several of which are considered to have ornamental value; all are bulb-producing perennials in nature. Most members of the genus are native to southeastern Asia and the Orient. Surprise lily itself is a sterile triploid and probably is a hybrid between *L. straminea* and *L. incarnata*. Although its exact origin is uncertain, many believe it to be native to Japan or China.

The flowers of surprise lily are very showy and fragrant. They are rose-lilac or pink in color, tubular in shape, and about three inches in length. Flowers are borne in

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clusters of four to seven as an umbel atop leafless scapes about 18 to 24 inches in height. The latter seemingly pop out of the ground with no evidence of foliage to support their growth. The flowers of surprise lily have similarly appearing petals and sepals (tepals) which reflex to form a flower about three inches in diameter. Unfortunately, since they emerge during the heat of late-summer, the flowers are not particularly long-lived.

The foliage of surprise lily starts to appear in the fall after the flowers have died back. However, it is not until the following spring that significant growth is made. Leaves grow to a length of about 12 to 18 inches by the end of spring. They are strap-like in appearance and about one inch in width. One negative aspect about this plant is that its leaves begin to look unthrifty late in the spring garden as they turn yellow and die back. However, they should not be removed until they totally wither and collapse.

As mentioned above, members of the genus *Lycoris* produce bulbs. These bulbs multiply via offsets which, in turn, form clumps that may stay in place in the landscape for many years. Eventually, they will become too crowded and division and transplanting will become necessary. Bulbs should be planted about four to six inches deep after flowering has ended. Surprise lily performs best in full-sun locations although they can be grown in light shade with good results. Like most species that produce bulbs, they prefer soil that is porous and well-drained. Other than the latter they tolerate a wide range of soils types and fertility levels.

Surprise lily is a robust plant that requires little care. Hardy in USDA zones 5-10 it is nearly free of insect pests and diseases. Grasshoppers pose somewhat of a problem since they have been known to devour the succulent scapes and buds nearly as fast as they emerge. Fortunately, this occurs only during years of heavy grasshopper infestation or in hot, dry years when other vegetation is not readily available outside of the garden.

For gardeners who would like to try another species of *Lycoris* that can tolerate our climate, *L. radiata*, or spider lily, should be considered. It is not as hardy as surprise lily and must be planted in protected locations such as near the warm foundation of a house or provided with mulch for added winter protection. It produces unique red flowers which have very long anthers (hence the common name) that put on a spectacular display in early September. The leaves are green with a light gray band through them. Since its leaves are both shorter and thinner than those of surprise lily, the foliage is more attractive during the spring as it dies down.

Dave Trinklein,
Associate Professor
Division of Plant Sciences
TrinkleinD@missouri.edu

Cover Crops and Green Manure Crops

A Gardener's goal is have a productive garden every year. Applying synthetic fertilizers during the growing season is not sufficient for maintaining a sustainable soil. After harvesting crops, a good management practice is to buildup and maintain the soil during the off season so that it will be more fertile and productive for the next growing season. Growing cover or green manure crops is a key for this desired goal since they help maintain soil fertility, soil health and productivity instead for harvesting. The terms cover crops and green manure crops are sometimes used interchangeably based on the growers perspective. A cover crop is usually a specific annual, biennial, or perennial grasses or legumes or a combination of two or more grown between regular growing seasons for the purpose of mainly to prevent soil erosion by protecting and improving the soil. When cover crops are tilled into the soil,

it is referred to as green manure crop. A green manure crop is usually grown to help maintain soil organic matter and nitrogen availability.

Why grow cover/green manure crops? Cover crops can protect soil from wind and water erosion, suppress weeds, fix atmospheric nitrogen, scavenge soil nitrogen, build soil structure, reduce surface crusting, improve water infiltration, break hardpan, improve soil/ water quality and reduce insect pests. Benefits from these crops depend on biomass productivity before the soil is prepared for the next crop. When cover crops are buried and tilled into the soil, the green manure that is added enhances soil fertility and structure by feeding soil microbial populations and which also glue together soil particles to form soil aggregates. When plant material is decomposed by soil microbes, they break down and release nitrogen and other

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Cover Crops and Green Manure Crops

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nutrients to the soil. Nitrogen accumulation and release is greater with legumes, which have nitrogen fixing bacteria in roots (Table 1)

Table 1: Nitrogen accumulation of selected cover crops.

Cover Crop	Nitrogen Accumulation*
Hairy vetch	3.2 lbs/1000 sq. ft
Crimson clover	2.6 lbs/1000 sq ft
Austrian winter pea	3.3 lbs/1000 sq ft
Winter (annual)rye	2.0 lbs/1000 sq ft

*Nitrogen accumulated in growing crop prior to tilling under
Source: ATRA: Overview of Cover Crops and Green Manures

Selection of cover crops: Success in the growth of cover crops requires proper selection of the cover crop, correct timing of seeding and management practices. Species selection depends on targeted planting date and the purpose for growing it. Legume cover crops have a symbiotic relationship with bacterial that fix atmospheric nitrogen into a form plants can use. Non legumes species scavenge existing soil nitrogen and other nutrients and reduce leaching losses. There are many traditional cover crops to select from, including annual rye grass, cereal rye, winter wheat, oats, white clover, sweet clover, crimson clover hairy vetch and buck wheat. Grasses are easier to establish than legumes such as clover as they germinate quickly and do not require inoculation.

Early vegetable harvest begins in mid to late summer. Rather than leaving the ground open to weeds, the land can be improved by planting over crops. For planting in July/August the main choices are buckwheat, clovers and Sudan grass. These cover crops are best when sown during July through early August. If garden space becomes available after harvest in late August and September, barley, annual rye grass, oats and clover can be successfully established. The last date by which cover crops can be planted in Missouri will be end of October to early November. Winter annual grasses such as cereal rye and wheat can be planted by the beginning to mid October.

Given the growing conditions in Missouri, annual rye grass can be considered first for a garden cover crop. Win-

ter rye is another good choice that is best for late planting.

Establishment of cover crops are similar to planting any garden seed including raking the garden area and remove the residues. Next broadcast the cover crop seed of your choice and lightly rake the soil to incorporate the seeds with the surface soil and water the soil surface lightly to provide the required moisture for germination.

When to kill cover crops in spring?

Early to mid April is the best time to kill over wintering grass cover crops whereas legumes should be allowed to grow longer into the spring. They can be killed with an herbicide or plants can be killed by plowing them in to the soil. To get the most of nitrogen out of grains such as rye, the best time to kill is when they have greened up after winter and are about 6 inches tall. When rye is larger than 6" nitrogen can get tied up in soil by a process referred to as nitrogen immobilization which can prevent it from being available when your plants needs. To get the full nitrogen benefit from legumes they must be allowed to grow until they begin to bloom. Afterward they can be killed by shallow tillage.

The chart given on page 63 provides an overview of cover crops at a glance adopted from Cornell University Gardening Resources with Cover Crops fact sheet. Seeds can be purchased at your local garden center or garden section of stores that sell garden products.

*Manjula V. Nathan,
Director, MU Soil and Plant Diagnostic Service Laboratories
Division of Plant Sciences
NathanM@missouri.edu*

*Tim Reinbott,
Superintendent, Bradford Research and Extension Center
ReinbottT@missouri.edu*

Cover Crops and Green Manure Crops

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POPULAR AND USEFUL CHOICES OF COVER CROPS									
	Vigor of germination & establishment	Seed cost to plant 1000sqft	Time of planting	Over-winter ability	Growth amount	Ease of incorporation	Soil structure improvement	Applic. rate; oz/100sq ft	Comments
Annual Ryegrass	***	*	Aug - Sept	NO	**	**	***	2	Overall an easy crop to establish
Perennial Ryegrass	**	**	Aug - mid Sept	***	**	*	**	1	Faster establishment than other perennials. Extensive root system
Winter Rye	***	**	Aug - Oct	***	***	*	**	3	Can Grow at low pH and at cool temperatures
Oats	***	**	Aug - Sept	NO	*	***	*	4	Requires good soil drainage, but tolerates low pH
Winter Wheat	***	**	Aug - Oct	***	***	*	**	3	Requires fertile soil; avoid wet or low pH soil
Sweet Clover	*	*	Summer	***	***	**	**	1	Better with high pH than other clovers
White Clover	*	*(*)	Summer	***	*	***	**	1	Good for low pH soil, treat with inoculant
Tall Fescue	*	***	Spring	***	*	**	**	1	Persistent, may become weedlike
Buckwheat	***	**	Spring	NO	**	***	*	3	Do not allow to mature, or reseeding will occur
*** = Relatively High			** = Moderate				* = Relatively Low		
Note: Packages of Ryegrass Usually Contain a Mixture of Annual & Perennial Types									

References:

1. Cornell Gardening Resources: Improve your soil with cover crops. Fact sheet
2. ATTRA: Overview of Cover Crops and Green Manure
3. Why use cover crops in vegetable rotations, Cover Crops guide, Cornell University
4. Cover Crops and Green Manure Crops. GMG Garden Notes #244. Colorado State university Extension Publication.

September Gardening Calendar

Ornamentals

- **Weeks 1-4:** Continue planting evergreens now.
- **Weeks 1-3:** Cuttings of annuals can be taken now to provide vigorous plants for overwintering.
- **Weeks 1-3:** Herbs such as parsley, rosemary, chives, thyme and marjoram can be dug from the garden and placed in pots now for growing indoors this winter.
- **Weeks 2-4:** Except tulips, spring bulbs may be planted as soon as they are available. Tulips should be kept in a cool, dark place and planted in late October.
- **Weeks 2-3:** Begin readying houseplants for winter indoors. Prune back rampant growth and protruding roots. Check for pests and treat if necessary. Houseplants should be brought indoors at least one month before the heat is normally turned on.
- **Weeks 3-4:** Perennials, especially spring bloomers, can be divided now. Enrich the soil with peat moss or compost before replanting.
- **Weeks 3-4:** Divide peonies now. Replant in a sunny site and avoid planting deeply.
- **Weeks 3-4:** Lift gladiolus when their leaves yellow. Cure in an airy place until dry before husking.
- **Week 3:** Poinsettias can be forced into bloom for Christmas if they are moved indoors now to a sunny windowsill. Each night, they must be kept in a cool, dark place where there is no light for 14 hours. This must continue until proper color is achieved in 6-10 weeks.

Lawns

- **Weeks 1-4:** Cool season lawns are best fertilized in fall. Make up to 3 applications between now and December. Do not exceed rates recommended by fertilizer manufacturer.
- **Weeks 1-4:** If soils become dry, established lawns should be watered thoroughly to a depth of 4-6 inches.
- **Weeks 1-4:** Begin fall seeding or sodding of cool season grasses. Seedbeds should be raked, dethatched or core-aerified, fertilized and seeded. Keep newly planted lawn areas moist, but not wet.
- **Weeks 2-4:** Lawns may be topdressed with compost or milorganite now. This is best done after aerifying.
- **Weeks 3-4:** It is not uncommon to see puffballs in lawn areas at this time.
- **Weeks 3-4:** Newly seeded lawns should not be cut until they are at least 2 or 3 inches tall.

Vegetables

- **Weeks 1-2:** Egyptian (top-setting) onions can be divided and replanted now.
- **Weeks 1-2:** Sowing seeds of radish, lettuce, spinach and other greens in a cold frame will prolong fall harvests.
- **Weeks 2-4:** Keep broccoli picked regularly to encourage additional production of side shoots.
- **Weeks 2-3:** Pinch out the top of Brussels sprout plants to plump out the developing sprouts.
- **Weeks 2-3:** Harvest herbs now to freeze or dry for winter use.
- **Weeks 2-3:** Tie leaves around cauliflower heads when they are about the size of a golf ball.
- **Weeks 3-4:** Pinch off any young tomatoes that are too small to ripen. This will channel energy into ripening the remaining full-size fruits.
- **Week 4:** Sow spinach now to overwinter under mulch for spring harvest.

Fruits

- **Week 1:** Pick pears before they are fully mature. Store in a cool, dark basement to ripen.
- **Weeks 3-4:** Bury or discard any spoiled fallen fruits.
- **Week 4:** Paw paws ripen in the woods now.
- **Week 4:** Check all along peach tree trunks to just below soil line for gummy masses caused by borers. Probe holes with thin wire to puncture borers.

Miscellaneous

- **Weeks 1-4:** Autumn is a good time to add manure, compost or leaf mold to garden soils for increasing organic matter content.
- **Weeks 1-2:** Monitor plants for spider mite activity. Reduce their numbers by hosing off with a forceful spray of water.
- **Weeks 2-4:** Seasonal loss of inner needles on conifers is normal at this time. It may be especially noticeable on pines.

Gardening Calendar supplied by the staff of the William T. Kemper Center for Home Gardening located at the Missouri Botanical Garden in St. Louis, Missouri. (www.GardeningHelp.org)