Volume 33, No. 3

July-August, 2010

UW Extension
Cooperative Extension

N.E.W. Horticulture Newsletter

Inside this issue *Page*

Mulches are an important component in horticulture; enhancing the overall sustainability of both production and landscape systems. The term "mulch" has its origins in the Germanic word "molsh" meaning soft and is often likened to the organic duff layer found on the forest floor. *(Chalker-Scott 2007)*

Mulches

By Dr. Robert Schutzki, Professor, Department of Horticulture, Michigan State University and Dr. Bert Cregg, Associate Professor, Departments of Horticulture and Forestry, Michigan State University.

Mulches are considered to be any materials applied to cover and protect the soil surface. The extent of "protection" varies with the selected material, the intended use and its application. The ideal mulch is: loose, well aerated; does not compact; does not inhibit water or air movement in the soil; breaks down slowly; buffers rapid changes in soil temperature and moisture; does not present a fire hazard; is weed free; attractive; and stays in place.

Mulches are usually classified as organic, inorganic and synthetic. Organic mulches are basically plant products in various forms including: bark (hardwood and coniferous); ground wood products; pine straw (needles); composted leaves; and composted manure. Organic mulches contribute to a healthy environment by enhancing the overall appearance of our landscapes, enriching our soils and aiding plant growth. Inorganic mulches are products from the earth such as stones, rocks and gravels. They may be whole or crushed and provide their benefits through shielding the soil surface. Inorganic mulches enhance aesthetics and provide physical protection of the soil; however, they do not contribute to soil structure or nutrient availability. It also should be noted that dust from crushed limestone materials can influence soil pH. Synthetic mulches include plastic, fabrics, foils, and ground rubber. With the exception of ground rubber, these materials are usually used in combination with other coverings and provide physical protection. The complementing material usually provides the aesthetics.

The aesthetic, economic and environmental benefits of mulches have been well documented. Mulches are an important component in improving the sustainability of landscape systems.

They, particularly organic, enhance sustainability by reducing chemical inputs and the use of fossil fuels to maintain healthy and aesthetically pleasing landscapes. Mulches in our urban and suburban landscapes also play a significant role in providing ecosystem services. Ecosystem services are the beneficial resources and processes that we receive from the natural environment. The Millennium Ecosystem Assessment

Continued on page 2...

*Mulches...**(continued from page 1)*

(2006) categorized these services into four groups: provisioning; regulating; supporting; and cultural. Mulches provide a benefit in each one of these groups through contributions to: crop production, energy conservation and water quality; carbon sequestration, waste recycling and decomposition, pest and disease control; nutrient cycling; and aesthetics or recreation uses.

Benefits of Mulches

Enhance Aesthetics

It goes without saying that mulches add to the aesthetic appeal of the landscape.

The host of materials and their different colors and textures attest to the importance that the general public places on its use. This is further supported by the increased use of color-enriched organic and synthetic mulches.

Conserve Soil Moisture

Mulches conserve and enhance soil moisture by increasing percolation, reducing evaporation and reducing the evapotranspiration losses due to weeds. Coarse organic and inorganic mulches allow water to percolate into the soil structure. These soils have the ability to retain this moisture due to the reduced evaporation from the mulch surface. Mulch surfaces may appear dry, but due to the large pore spaces of the mulch particles, soil moisture is not drawn from the soil depths and lost to the atmosphere. Fine textured mulches on the other hand may retain too much moisture and not allow for adequate aeration within the soil structure. In suppressing weeds, mulches eliminate the evapotranspiration losses that contribute significantly to reduced soil moisture loss at the surface layers of the landscape.

Regulate Temperature Fluctuations

Mulches help minimize extreme temperature fluctuations at the soil surface. These temperature extremes, both hot and cold, can have a negative impact on fine roots. Organic mulches are more tempering in their influence than inorganic mulches. Coarse mulches are more influential than fine textured mulches. The ability to minimize soil temperature extremes is particularly beneficial in fall plantings where the objective is to extend the period of root development and maximize establishment.

Provide Nutrients (organic mulches) in Forms that are Readily Available

As they decompose, organic mulches release nutrients into the soil. These nutrients are available for use by plants and soil microorganisms. Although the amount released may be minimal and not adequately address nutrient deficiencies, their benefits have been recognized.

Soil pH

It has been widely promoted that organic mulch contributes to a decrease in soil pH. Pine needles have been touted as the most acidifying of the group. In the review of landscape mulches (Chalker-Scott 2007), no scientific studies were found to support the influence of mulches in lowering soil pH. A study on pine bark and pine needles found no influence on soil pH. Quite the contrary to what has been suggested over the years. In our study (Cregg and Schutzki 2009), we found no difference in soil pH among any of the mulch treatments or between the mulched and unmulched plots.

Nitrogen Deficiencies

Another point concerning mulches needs clarification. There is no evidence that organic mulches cause nitrogen deficiencies in landscape soils. We all have seen chlorotic ground covers and other herbaceous plants following planting with the thoughts being that microorganisms are tying up nitrogen during decomposition. The potential tie-up is within the mulch not within the soil below it. Quite often the nitrogen deficiency found in the ground covers is because they were planted in the mulch, not in the soil.

Continued on page 10...

Made in the Shade:
Woody Plants for Shady Gardens

By: Dr. Laura G. Jull, Dept. of Horticulture, University of Wisconsin–Madison

Since plants require sunlight for growth, exposure to the sun is a basic environmental consideration when selecting plants. Most plants prefer full sun to light shade for proper growth and flowering while some tolerate dense shade and are often found as understory plants in woodlands. Plants requiring full sun conditions will need at least 6 hours of direct sunlight per day; partial shade tolerant plants require 2-5 hours of direct sunlight per day, particularly in the mornings, whereas shade-loving plants need less than 2 hours of direct sunlight each day, filtered sunlight, or no direct sun.

Consider the duration and directness of sunlight. Do buildings or other trees shade the site? The type of shade in a landscape can change over time, becoming denser as trees and shrubs mature and fill in spaces. Light patterns can also change with the seasons and can affect growth patterns. An area that is in full sun in summer when the sun is high in the sky may have partial shade in spring and fall when the sun is at a lower angle. Visiting the site at different times of the day and season will help you determine the light patterns and choose a species appropriate to those conditions.

TREES

Acer japonicum: full moon maple, Zone 5a
Acer palmatum var. *atropurpureum* 'Wolff': Emperor 1™ purpleleaf Japanese maple, Zone 5a
**Acer pensylvanicum*: moosewood, snake-bark maple, native, acid soils, Zone 3b
Acer pseudosieboldianum: Korean maple, purple-bloom maple, Zone 4a
**Acer spicatum*: mountain maple, native, slightly acid soil, Zone 3a
**Acer tegmentosum*: Manchu-striped maple, slightly acid soil, Zone 4b
**Acer* 'White Tigress': White Tigress snake-bark maple, slightly acid soil, Zone 4 (pictured below)

Acer 'White Tigress': White Tigress Snake-bark maple

Amelanchier arborea: downy serviceberry, native, slightly acid soil, Zone 3b
Amelanchier x *grandiflora*: apple serviceberry, native, slightly acid soil, Zone 3a
Amelanchier laevis 'Cumulus': Cumulus serviceberry, slightly acid soil, Zone 3a
**Asimina triloba*: pawpaw, slightly acid soil, Zone 5a
**Carpinus caroliniana:* American hornbeam, musclewood, native, slightly acid soil, Zone 3b
Cercis canadensis: eastern redbud, Zone 4b
**Cornus alternifolia:* pagoda dogwood, native, slightly acid soil, Zone 3b
Cornus mas 'Golden Glory': Golden Glory corneliancherry dogwood, Zone 4b
Halesia tetraptera: Carolina silverbell, slightly acid soil, Zn 4b
Halesia tetraptera var. *monticola* 'Rosea': pink mountain silverbell, slightly acid soil, Zone 4b
Magnolia tripetela: umbrella magnolia, slightly acid soil, Zn 5a
Magnolia sieboldii: Siebold magnolia, Zone 5b
Morus rubra: red mulberry, native, Zone 4b
Ostrya virginiana: American hophornbeam, ironwood, native, Zone 3b
Parrotia persica: Persian parrotia, Zone 5b
**Ptelea trifoliata:* wafer-ash, hoptree, native, slightly acid soil, Zone 4a
Stewartia pseudocamellia: Japanese stewartia, acid soils, Zn 5a

Continued on page 4...

Shade... *(continued from page 3)*

Carpinus caroliniana, Musclewood

EVERGREENS

Abies balsamea: balsam fir, native, acid soil, Zone 3a
Abies koreana 'Silberlocke': Silberlocke Korean fir, Zone 5a
Chamaecyparis pisifera: Sawara or Japanese falsecypress, slightly acid soil, Zone 4b
Microbiota decussata: Russian-arborvitae, Siberian cypress, Zone 3b
**Taxus canadensis*: Canada yew, native, Zone 2b
**Taxus cuspidata:* Japanese yew, Zone 4b
**Taxus* x *media:* Anglojapanese yew, Zone 4b
Thuja occidentalis: American arborvitae, northern white-cedar, native, Zone 3a
Thuja plicata: western red-cedar, Zone 5a
**Tsuga canadensis*: Canadian hemlock, native, slightly acid soil, Zone 3b
Tsuga diversifolia: Northern Japanese hemlock, slightly acid soil, Zone 5a

DECIDUOUS & BROAD-LEAVED EVERGREEN SHRUBS

Aesculus parviflora: bottlebrush buckeye, Zone 4b
Amelanchier alnifolia: saskatoon serviceberry, slightly acid soil, Zone 4
Amelanchier canadensis: shadblow serviceberry, slightly acid soil, Zone 3b
Amelanchier sanguinea: roundleaf serviceberry, native, slightly acid soil, Zone 4
Amelanchier stolonifera: running serviceberry, native, slightly acid soil, Zone 3a
Buxus spp.: Green Series boxwood, Zone 5a, 'Green Velvet', 'Green Mound', 'Green Gem', 'Green Mountain', 'Glencoe', 'Northern Charm'
Buxus sinica var. *insularis*: Korean littleleaf boxwood, Zone 4b
**Calycanthus floridus:* Carolina allspice, common sweetshrub, Zone 5a
Cephalanthus occidentalis: buttonbush, native, Zone 4b
Chionanthus virginicus: fringetree, Zone 4b
Clethra alnifolia: summersweet clethra, slightly acid soil, Zone 4b
Comptonia peregrina: sweetfern, native, acid soils, Zone 3
Cornus racemosa: gray dogwood, native, Zone 3b
**Cornus rugosa*: roundleaf dogwood, native, Zone 3a
Corylus americana: American hazelnut, American filbert, native, Zone 3a
Corylus cornuta: beaked filbert, native, Zone 3a
**Daphne* x *burkwoodii* 'Carol Mackie': Carol Mackie daphne, Zone 4b
**Diervilla lonicera*: dwarf bush-honeysuckle, native, Zone 3a
**Diervilla sessilifolia*: southern bush-honeysuckle, Zone 4b
**Dirca palustris:* leatherwood, native, slightly acid soil, Zone 4
Disanthus cercidifolius: Disanthus, Zone 5a
**Eleutherococcus sieboldianus* 'Variegatus' or 'Aureo-Marginatus': variegated fiveleaf aralia, Zone 4b
Enkianthus campanulatus: redvein Enkianthus, acid soils, Zone 5a
Euonymus atropurpureus: eastern wahoo, native, Zone 4b
Euonymus bungeanus: winterberry euonymus, Zone 4b
Euonymus europaeus: European spindletree, Zone 4a
Fothergilla gardenii: dwarf fothergilla, slightly acid soil, Zone 4b
Fothergilla major: large fothergilla, slightly acid soil, Zone 4b
**Hamamelis vernalis*: vernal witchhazel, slightly acid soil, Zone 4b
**Hamamelis virginiana:* common witchhazel, native, slightly acid soil, Zone 3b
**Hydrangea arborescens:* smooth hydrangea, Zone 4a 'Annabelle', 'Hayes Starburst', Incrediball™, Invincibelle Spirit™, White Dome®
Hydrangea macrophylla 'Bailmer': Endless Summer® hydrangea, Zone 5a
Hydrangea quercifolia: oakleaf hydrangea, Zone 5b
Ilex x *meserveae*: blue holly, slightly acid soil, Zone 5a
**Itea virginica:* Virginia sweetspire, acid soils, Zone 5b
**Kalmia latifolia*: Mountain-laurel, acid soils, Zone 5a
*Kal*mia polifolia:* bog kalmia, native, acid soils, Zone 2
Kerria japonica: Japanese kerria, Zone 5a
Leucothoe fontanesiana: drooping leucothoe, acid soil, Zone 5b
Ligustrum obtusifolium subsp. *regelianum*: Regel's border privet, Zone 4b
**Lindera benzoin*: spicebush, slightly acid soil, Zone 5b
**Lonicera canadensis*: American fly honeysuckle, native, Zone 3a
**Mahonia* (now *Berberis*) *aquifolium*: Oregon grapeholly, acid soils, Zone 5b
Neviusia alabamensis: Alabama snow-wreath, slightly acid soil, Zone 5a
Paxistima canbyi: canby paxistima, Zone 4a
**Pieris floribunda:* mountain pieris, acid soils, Zone 5b
Pieris japonica: Japanese pieris, acid soils, Zone 5b
Rhododendron arborescens: sweet azalea, acid soils, Zone 4b
**Rhododendron catawbiense*: catawba rhododendron, acid soils, Zone 5b

Continued on page 5...

Shade... *(continued from page 4)*

Cornus alternifolia, Pagoda Dogwood

Rhododendron dauricum: Dahurian rhododendron, acid soils, Zone 4b
**Rhododendron* spp.: Finnish hybrid rhododendrons, acid soils, Zone 4b, several cultivars: 'Elvira', 'Haaga', 'Hellikki', 'Helsinki University', 'Mikkeli', 'Peter Tigerstedt', and 'Pohjola's Daughter'
Rhododendron mucronulatum: Korean rhododendron, acid soils, Zone 4b
Rhododendron [P.J.M. Hybrid Group]: P.J.M. Hybrid Series, acid soils, Zone 4a
Rhododendron periclymenoides: pinxterbloom azalea, acid soils, Zone 4b
Rhododendron prinophyllum: roseshell azalea, acid soil Zone 4a
Rhododendron schlippenbachii: royal azalea, acid soils, Zone 4b
Rhododendron spp.: Northern Lights Series & other "Light" deciduous azaleas, acid soils, Zone 4a
**Rhododendron vaseyi*: pinkshell azalea, acid soils, Zone 5a
Rhododendron yedoense var. *poukhanense*: Korean azalea, acid soils, Zone 5
**Rhodotypos scandens*: black jetbead, Zone 5a
Rhus aromatica: fragrant sumac, native, Zone 3b
Ribes alpinum: alpine currant, Zone 3a
**Rubus odoratus*: thimbleberry, native, Zone 4a
Sambucus canadensis: American elderberry, native, Zone 3b
Sambucus nigra: European elderberry, Zone 4b
**Sambucus pubens*: American red elderberry, native, Zone 3b
Sambucus racemosa: European red elderberry, Zone 4a
Sorbaria sorbifolia: Ural falsespirea, Zone 3a
**Staphylea trifolia:* American bladdernut, native, Zone 4a
Stephanandra (now *Neillia*) *incisa* 'Crispa': dwarf cutleaf stephanandra, slightly acid soil, Zone 4b
Symphoricarpos albus: common snowberry, native, Zone 3b
Symphoricarpos orbiculatus: Indiancurrant coralberry, Zone 3b
**Viburnum acerifolium*: mapleleaf viburnum, native, slightly acid soil, Zone 4
Viburnum cassinoides: withered viburnum, native, slightly acid soil, Zone 4a
Viburnum lantana: wayfaringtree viburnum, Zone 4a
**Viburnum lantanoides*: hobblebush viburnum, slightly acid soil, Zone 4
Viburnum opulus var. *americanum* (formerly *V. trilobum*): American cranberrybush viburnum, native, Zone 3a
**Viburnum rafinesquianum*: Rafinesque viburnum, downy arrowwood viburnum, native, Zone 4b
Viburnum x *rhytidophylloides:* lantanaphyllum viburnum, Zone 5b

GROUNDCOVERS (WOODY)

**Cornus canadensis*: bunchberry, native, acid soils, Zone 3
Epigaea repens: trailing arbutus, native, acid soils, Zone 2b
**Euonymus fortunei* 'Coloratus': purpleleaf wintercreeper, Zone 4b
**Euonymus obovatus*: running euonymus, native, Zone 3
**Gaultheria procumbens*: wintergreen, native, acid soils, Zone 3
**Hedera helix*: English ivy, Zone 4b
**Mahonia repens*: creeping mahonia, acid soils, Zone 5a
Microbiota decussata: Russian-arborvitae, Zone 3b
**Mitchella repens*: partridgeberry, native, acid soils, Zone 3
Pachysandra procumbens: Allegheny pachysandra, slightly acid soil, Zone 4b
**Pachysandra terminalis*: Japanese pachysandra, slightly acid soil, Zone 4b
Rhus aromatica 'Gro-low': Gro–low fragrant sumac, native, Zone 3b
**Vinca minor:* vinca, myrtle, periwinkle, Zone 4a
**Xanthorhiza simplicissima*: yellowroot, slightly acid soil, Zone 3b

VINES

**Akebia quinata*: fiveleaf akebia, chocolate vine, Zone 4b
**Aristolochia macrophylla*: Dutchman's pipe, Zone 4a
Clematis occidentalis: western blue virgin's-bower, native, Zone 2b
Clematis terniflora: sweet autumn clematis, Zone 4a
**Clematis virginiana*: virgin's-bower, native, Zone 3a
**Euonymus fortunei* 'Vegetus': bigleaf wintercreeper, Zone 4b
**Hedera helix:* English ivy, Zone 4b
Hydrangea anomala subsp. *petiolaris:* climbing hydrangea, Zone 5a
**Menispermum canadense:* common moonseed, native, Zone 3b
**Parthenocissus inserta:* woodbine, native, Zone 3b
**Parthenocissus quinquefolia*: Virginia creeper, native, Zone 3b
Parthenocissus tricuspidata: Boston ivy, Zone 4b
Schizophragma hydrangeoides: Japanese hydrangea-vine, Zone 5b
**Smilax tamnoides*: bristly greenbrier, native, Zone 3a
Vitis riparia: riverbank grape, native, Zone 4

Understanding Nitrogen Sources in Turfgrass Fertilizers

By: Doug Soldat, Dept. of Soil Science, University of Wisconsin-Madison

There are many different types of nitrogen fertilizers on the market, and choosing between them can get confusing. The following article will help to provide information on the primary differences and similarities to help you make the best decision for your particular situation. If you are looking for more information, a fantastic in-depth publication on fertilizer sources by Dr. Jerry Sartain from the University of Florida. You can view it here: http://edis.ifas.ufl.edu/pdffiles/SS/SS31800.pdf

In general, nitrogen sources can be classified into two groups: quick release or slow release. The quick release sources are typically the least expensive, but also only available for a short time, may burn the turf if over-applied, and most subject to environmental losses. The slow release fertilizers are a loosely defined group, with many sub-groups. Reading fertilizer labels and understanding how a particular product will work gets fairly tricky, especially when most fertilizers contain a wide variety of quick and slow release nitrogen sources all mixed together. After describing the different nitrogen sources, we'll look at a few fertilizer labels and try to interpret them with our new found knowledge.

Quick Release Nitrogen Sources

Urea: Widely available, used in a high percentage of all turfgrass fertilizers. Will produce a greening response in less than a week, response is rate dependant but usually limited to four weeks. Subject to volatilization if not watered-in or stabilized. On a fertilizer label (guaranteed analysis) this category might have an asterisk that will indicate whether some or all of the urea is coated and therefore, slow release.

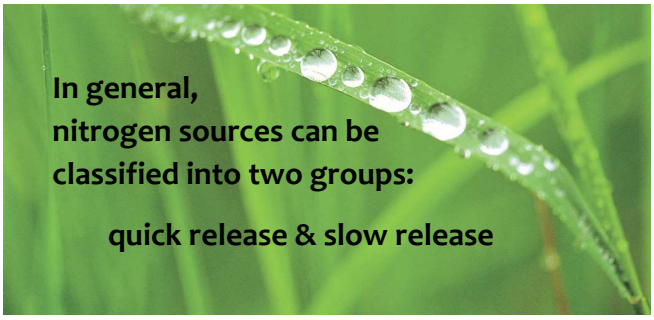
Ammonium phosphate: usually used as the primary source of phosphorus in a fertilizer, although biosolids is another common (and still legal) source.

Ammonium sulfate: higher burn potential than urea, more acidifying as well, subject to volatilization if not watered-in or stabilized. Response usually limited to four weeks

Stabilized nitrogen: Usually urea (sometimes ammonium sulfate) with a urease inhibitor and/or a denitrification inhibitor. These chemical additives keep urea and ammonium in the soil longer, which reduces losses to the atmosphere and groundwater compared to plain old urea. All of the nitrogen is available within a week after application, but stabilized nitrogen has been shown to be more efficient, which translates to more nitrogen getting into the plant than with "non-stabilized" nitrogen (i.e. no additives). These products have become very popular in the last decade or so, but are commonly confused with slow release nitrogen, which are made available to the plant slowly, instead of all at once.

Water soluble nitrogen: This is a catch all term used on the fertilizer label for any and all forms of nitrogen that are soluble in water. Sometimes this category will have an important asterisk next to it, which will usually say that a portion of the material can be classified as slow release nitrogen.

Continued on page 7...



*Turfgrass Fertilizers…**(continued from page 6)*

Slow Release Nitrogen Sources

Methylene Ureas: a class of synthetically produced organic fertilizers (not allowable for use in organic farming) which are created by reacting urea and formaldehyde to make chains of various lengths. Short chained methylene ureas will become available to the plant in a few weeks or months. Longer chains may take years. Usually, a fertilizer contains a mixture of short and long chained methylene ureas, which produce a small but sustained release of nitrogen over the season. Nitrogen release greater at high soil temperatures.

Sulfur or Polymer Coated Urea: The name says it all: urea coated with sulfur and/or a polymer (think Saran Wrap). The polymer coated products tend to be more expensive than sulfur coated products, but the coatings are more robust and the release can be more predictable than sulfur coated urea. That said, sulfur coated urea may be the best slow release fertilizer when considering cost-effectiveness along with performance. Sulfur coated ureas may last four to eight weeks, some polymer coated products can be produced to last all season, when applied at higher rates. Nitrogen release not as dependant on soil temperature as methylene ureas.

Biosolids: Heat-treated municipal waste products that must meet exacting standards of the EPA for pathogen and heavy metal content. Commonly added to fertilizers as a legal source of phosphorus in Wisconsin, as well as a source of carbon. Contains 10-20% quick release nitrogen (ammoniacal nitrogen) and 80-90% slow release nitrogen. Nitrogen release greater at high soil temperatures.

Animal Manures or Natural Organic Fertilizers: Similar to biosolids, but some poultry manures may contain up to 50% quick release nitrogen, resulting in an immediately noticeable green-up. Others may contain 0% quick release nitrogen, and visual responses may be difficult to notice until soil temperatures increase.

Interpreting Fertilizer Labels

Now that we've covered the primary sources of nitrogen in fertilizers, let's take a look at two labels and determine the percentage of slow release nitrogen and take a guess at what the response to that fertilizer might look like. This process is more difficult than it should be, but with some practice you will be able to estimate the slow release content of a fertilizer pretty quickly.

The first label is shown to the right. First look at the items listed under the "N (28%)" column, notice that they add up to 28% (not 100%). Therefore, we want to add all the items that classify as slow release and then divide that number by 28. Ammoniacal nitrogen is a quick release source that comes from the ammonium phosphate; similarly, urea is also a quick release source. However, water insoluble nitrogen is technically slow release nitrogen, and the "other water soluble nitrogen" has an asterisk that indicates that this form is all slowly available nitrogen from methylene ureas. Therefore, we add these two together:

4.90% + 7.00% = 11.9%.

Now we simply divide that number by the 28% from the total N analysis: 11.9/28 = 0.425 or 42.5% slow release nitrogen.

Continued on page 8...

28-3-10

Guaranteed Analysis

N (28%):

1.18% Ammoniacal Nitrogen
14.9% Urea Nitrogen
4.90% Water Insoluble Nitrogen
7.00% Other Water Soluble Nitrogen*

P – as P_2O_5 (3%):

3.0% Ammonium Phosphate

K – as K_2O (10%):

10.0 % Potassium Chloride

* 7.00% Slowly available nitrogen from methylene ureas

*Turfgrass Fertilizers…**(continued from page 7)*

Here is another one. 6.6% ammoniacal nitrogen and 12.3 urea nitrogen are both quick release. That leaves 0.8% water insoluble nitrogen and the 9.3% "other water soluble nitrogen" with the asterisk that tells us it is all from methylene ureas. Notice this label tells us the specific type of methylene ureas. These happen to be shorter chains, resulting in a shorter response time (4 to 6 weeks). The calculations for percentage slow release nitrogen are below.

9.3 + 0.8 = 10.1
10.1 ÷ 29 = 0.348 or 34.8% slow release nitrogen

By now you should be getting the hang of this. Let's try one more. The asterisk after urea nitrogen tells us this product contains a urease and nitrification inhibitor, which means we are dealing with stabilized N). However, stabilized nitrogen is not technically slow release N, according to the powers that be because all of the nitrogen is plant available shortly after application. The chemical stabilizing agents act to make the fertilizer more efficient than just urea alone.

29-3-4

Guaranteed Analysis

N (29%):
6.6% Ammoniacal Nitrogen
12.3% Urea Nitrogen
0.8% Water Insoluble Nitrogen
9.3% Other Water Soluble Nitrogen*

P – as P_2O_5 (2%):
3.0% Ammonium Phosphate

K – as K_2O (4%):
4.0% Potassium sulfate

* contains 6.8% slowly available methylenediurea and dimethylenetriurea nitrogen

28-0-10

Guaranteed Analysis

N (28%):
28.0% Urea Nitrogen*

P – as P_2O_5 (0%):

K – as K_2O (10%):
10% Potassium chloride

*contains Nutrisphere-N (urease and nitrification inhibitor)

Note: another common example of this type of product would be UMAXX of UFLEXX

Now the question becomes, how will these fertilizer behave if applied at the same application rate? My guess is the 28-0-10 will provide the quickest green up but probably begin to fade after five of six weeks. It is not difficult to guess that the 28-3-10 and 29-3-4 will probably behave fairly similarly because they contain similar amounts and types of slow-release N. You'd likely see an initial green up from the 60-70% quick release in these fertilizers, then a sustained green response for six to eight weeks from the remaining 30-40% slow release portions.

Because we can expect these two products to behave similarly, choosing between them becomes much easier: look at the price tag.

Differentiating Dollar Spot from Red Thread in Home Lawns

By Jim Kerns, Assistant Professor and Extension Specialist, University of Wisconsin-Madison Dept. of Plant Pathology

This summer has been a plant pathologist's dream, albeit at the expense of our hardworking turfgrass managers in Wisconsin! We experienced one of the hottest summers on record in addition to prolific rainfall throughout the state. Fungi have run wild on turfgrass with the heat and humidity we experienced this summer. However, two diseases in particular have wreaked havoc on home lawns in Wisconsin - dollar spot and red thread.

These two diseases are foliar diseases that under the right environmental conditions can cause widespread damage to turfgrass. Yet the key word in the previous sentence is foliar! The pathogens that cause these two diseases do not usually affect the crown or growing point of a turfgrass plant. Therefore, recovering from dollar spot and red thread is relatively easy, except for this year. This year was extraordinarily hot throughout the Midwest, but it was not the daytime temperatures that were problematic. The factor that limited turfgrass growth severely this year was the nighttime temperatures.

Research at Rutgers University demonstrates that cool-season turfgrasses (i.e. Kentucky bluegrass, fine fescues, creeping bentgrass, perennial ryegrass and tall fescue), struggle when nighttime temperatures remain above 75°F for an extended period of time. That particular temperature does not sound high, but when nighttime temperatures remain this high soil temperatures cannot cool off. Consequently, we commonly measured soil temperatures exceeding 85°F in the top two inches of soil. These conditions are not conducive to turfgrass growth. As a result, we observed a lot of physiological decline and diseases such as dollar spot and red thread.

Dollar spot:

Dollar spot is a widespread disease of cool- and warm-season turfgrasses in the United States. The disease is caused by a fungus called *Sclerotinia homoeocarpa* and is most prevalent on any turfgrass when relative humidity is above 70% for an average of 5 days. Traditionalists claim that the disease is more severe when nitrogen fertility is lacking, but we have observed severe epidemics of this disease on turfgrass fertilized with varying levels of nitrogen fertility.

Figure 1. Typical stand symptoms of dollar spot in a Kentucky bluegrass sward.

Symptoms of the disease in higher cut turfgrass are bleached spots or patches ranging in size from 4 to 8 inches in diameter (Figure 1). Rarely do individual spots or patches exceed 8 inches, unless the

Continued on page 10...

Key Diagnostic Features

Dollar Spot

Bleached circular spots ranging in size from 4 to 8 inches
Leaf lesions with distinct brown or purple borders with a bleached center
Usually develops during the summer months and may last all summer

Red Thread

Straw, brown to tan colored patches ranging in size from 2 to 24 inches in diameter.
Production of red, threadlike (antler-like) structures in the upper canopy
Blighting of leaves from the tip to the base.

*Dollar Spot...**(continued from page 9)*

epidemic is so severe that individual patches begin to coalesce forming huge patches. Lesions are apparent on individual plants and usually have a bleached center that is surrounded by a red-brown or purple border (Figure 2). Normally dollar spot symptoms develop around June 20 and can continue to develop throughout the summer months and may not cease until October.

The disease can be managed by avoiding mowing when dew is still present on the turf. Nitrogen applications do encourage the turf to "grow" out of the disease. If an automated irrigation system is used, watering should occur during early morning hours in order to limit leaf wetness. In the case of extreme epidemics, a fungicide may be warranted. There are many fungicides that are effective and if chemical control is necessary, please consult a turfgrass extension specialist or your local county Extension agent.

Figure 2. Typical dollar spot lesion produced on Kentucky bluegrass. Note the bleached center surrounded by a dark

Red Thread

Red thread is a disease of cool-season turfgrass during the spring and autumn when turfgrass plants are growing slowly and may lack available nitrogen. Fine fescues, perennial ryegrass and Kentucky bluegrass are especially susceptible to the disease. Stand symptoms normally develop as water-soaked patches ranging in size from 2 to 24 inches in diameter (Figure 3). As the disease progresses, leaves turn straw brown to tan with healthy leaves interspersed giving the turf a scorched appearance. Examination of affected leaves reveals blighting from the tip toward the base. The key diagnostic feature of red thread is the presence of colorful (bright red), threadlike sclerotia in the upper part of the turfgrass canopy (Figure 4).

Figure 3. Stand symptoms of red thread in a Kentucky bluegrass sward. Notice the "scorched" appearance due to intermingling of healthy and dead turf.

Red thread can develop year-round, but most often develops during the spring and fall. The disease is favored by low-light intensities and turf that is growing slowly due to lack of nitrogen. To manage red thread applications of quickly available nitrogen work well as does collecting the clippings during sclerotial production. Several fungicides provide effective control of red thread, but please consult local extension personnel before selecting a chemical.

Figure 4. Antler-like sclerotia of the red thread fungus. This is the key diagnostic feature for red thread, but scouting during the early morning hours may be necessary to find this structure.

These two diseases are very similar and wreaked havoc on homeowners this summer, but they can be diagnosed in the field. The key is to look for the key diagnostic features for each disease. The first thing to do is look at the property first thing in the morning to see if red thread sclerotia are present. If not, the next step is to examine the leaf for lesions. Remember to look for lesions around the perimeter of the affected area or it may be difficult to find a discrete lesion.

*Mulches...**(continued from page 2)*

Minimize Weed Seed Germination

Mulches reduce weed seed germination in two ways. They create a physical barrier at the soil surface thereby reducing or eliminating light from hitting the soil surface. The second way is through allelopathy. Allelopathy is the release of inhibitory chemicals from plant parts. These chemicals can inhibit seed germination and/or reduce plant growth. The most widely known example is juglone from Black Walnut. *Thuja* and *Pinus* species also exhibit allelopathic tendencies. In a recent research project (Cregg and Schutzki 2009), we found that cypress mulch suppressed weeds as well as the photosynthetic efficiency and growth of the landscape species in the project. This inhibition suggests that allelopathy is associated with cypress mulch.

Types of Mulch

Chris Starbuck (2008), Department of Horticulture, University of Missouri produced a series of comprehensive tables outlining the relative value of a variety of different mulch types. Tables 1, 2, 3 and 4 outline information for organic mulches based on degree of persistence, inorganic mulches, and synthetic mulches. This information is useful when evaluating the comparative benefits of different mulch types.

Table 1

Relative value of mulches that break down in one season or less.

Material	Resistance to compaction	Attractiveness	Resistance to wind blowing	Availability	Source of weeds & disease	Fire hazard	Comments
Compost	Good	Good	Excellent	Excellent	Fair	No	Value varies with ingredients
Corn stalks	Excellent	Unsatisfactory	Good	Fair	Excellent	Yes	Coarse and unsightly. Should shred or compost.
Hay	Good	Fair	Good	Fair	Fair	Yes	Good when available
Lawn clippings	Poor	Poor	Good	Excellent	Fair	No	Compost first
Leaf mold	Good	Good	Excellent	Excellent	Fair	No	Value varies with ingredients
Leaves	Unsatisfactory	Good	Poor	Excellent	Good	Yes	Compost first
Manure (well rotted)	Good	Good	Excellent	Fair	Unsatisfactory	No	Odor may be bad
Peat moss	Good	Excellent	Excellent	Excellent	Good	No	Universally available. Coarse grades best
Rice hulls	Good	Fair	Poor	Poor	Fair	No	Good when available.
Straw	Excellent	Poor	Poor	Good	Poor	Yes	Often contains grain seed.
Waste paper	Fair	Unsatisfactory	Unsatisfactory	Excellent	Excellent	Yes	Must be shredded. Unsightly.

Continued on page 12...

*Mulches...**(continued from page 11)*

Table 2

Relative value of some persistent mulches.

Material	Resistance to compaction	Attractiveness	Resistance to wind blowing	Availability	Source of weeds & disease	Fire hazard	Comments
Bark chunks	Excellent	Excellent	Excellent	Excellent	Excellent	No	Generally available. Expensive
Cocoa shells	Excellent	Excellent	Good	Poor	Excellent	No	High potassium content may cause problems
Corn cobs	Good	Poor	Good	Fair	Poor	No	Add nitrogen. Unsightly.
Cottonseed hulls	Good	Fair	Poor	Poor	Good	No	Hard to keep in place.
Pecan hulls	Excellent	Excellent	Good	Fair	Excellent	No	Locally available. Good.
Pine needles	Excellent	Good	Good	Fair	Good	Yes	Especially good on acid-loving plants.
Sawdust (coarse)	Fair	Fair	Good	Good	Excellent	No	Add nitrogen. Use aged material.
Sawdust (fine)	Poor	Fair	Poor	Good	Excellent	No	Compacts too easily. Requires nitrogen
Shredded bark	Good	Excellent	Excellent	Good	Excellent	No	Good when available.
Wood chips	Good	Good	Excellent	Good	Excellent	No	Inexpensive when available.
Wood shavings	Good	Good	Good	Fair	Excellent	No	Add nitrogen when spaded under.
Wood fibers	Fair	Fair	Good	Poor	Excellent	No	Add nitrogen. Coarse grade preferred.

Continued on page 13...

*Mulches...**(continued from page 12)*

Table 3

Inorganic mulching materials.

Material	Resistance to compaction	Attractiveness	Resistance to wind blowing	Availability	Source of weeds & disease	Fire hazard	Comments
Black plastic	Tears	Unsatisfactory	Unsatisfactory	Excellent	Excellent	No	Must anchor. Unsightly
Crushed rock	Excellent	Good	Excellent	Excellent	Excellent	No	Many colors available. Avoid crushed limestone.
Geotextile weed barrier	Excellent	Unsatisfactory	Unsatisfactory	Excellent	Excellent	No	Must anchor. Best covered by other mulch.
Gravel	Excellent	Good	Excellent	Excellent	Excellent	No	Use sparingly.
Volcanic rock	Excellent	Good	Excellent	Good	Excellent	No	Small sizes moved by water.
Perlite	Good	Good	Poor	Excellent	Excellent	No	Good as soil amendment.
Vermiculite	Fair	Fair	Poor	Excellent	Excellent	No	Physical structure breakdown.

Table 4

Synthetic mulching materials.

Material	Resistance to compaction	Attractiveness	Resistance to wind blowing	Availability	Source of weeds & disease	Fire hazard	Comments
Black plastic film	Tears	Unsatisfactory	Unsatisfactory	Excellent	Excellent	No	Must anchor. Unsightly.
Geotextile weed barrier	Excellent	Unsatisfactory	Unsatisfactory	Excellent	Excellent	No	Must anchor. Best covered by other mulch.

Continued on page 14...

*Mulches...**(continued from page 13)*

Mulch Application

Applying organic mulches may vary, but a general rule of thumb is to apply 3 inches to the landscape surface. It is important to remember to keep mulch about 6 inches from the trunks of woody trees and shrubs. Trunks that are in direct contact with mulch will stay too moist and may cause damage to the plant. This also discourages rodents from chewing the bark of the plants.

An application of 1-1½ inches of mulch is recommended for herbaceous perennials and ground covers, although it can also be beneficial for annuals. The general practice when using plugs, cells, or 2¼ inch pots is to prepare the soil to finished grade, apply the mulch and plant through the mulch ensuring that the root system is entirely in soil.

Application of inorganic mulches takes the particle size of the material and the corresponding gaps between the particles into consideration. The overall objective is uniform coverage while eliminating light penetration to the soil surface. Gravels or other rounded materials usually require multiple layers to achieve the desired coverage. Mulching with 2-inch stone may require 3 layers or a 4-6 inch depth to achieve uniform coverage with minimal open pore space. In some instances, multiple sizes will be used in combination to achieve the desired coverage. Crushed particles or other angular materials usually overlap or knit in a fashion that minimizes open pores.

Plastic films and fabrics are used as mulches in many production systems. Their use in the landscape or in other garden applications is in combination with another mulch cover. Fabrics and films are used for the most part as a weed barrier, however, they must allow air and moisture exchange from the soil surface. The use of films in association with organic mulches usually not recommended.

Mulch Practice

Mulch conserves soil moisture, reduces soil erosion, minimizes weed growth, moderates soil temperatures, and contributes to soil fertility following decomposition. However, abiotic disorders can surface from its improper or excessive use. Problems associated with improper mulching practice include excessive moisture build-up on trunk collars, negative impacts on rooting depth, promotion of girdling roots, and initiating nitrogen deficiencies in the case of ground covers and annuals plantings.

Planting Depth

The depth of the planting hole relates to the soil ball or container size, level of the root system and soil conditions. In heavier soils, it is suggested that plants be elevated to alleviate any problems with poor soil drainage. However, there may be problems associated with planting too high. It is important to "plant the plant in soil", meaning that soil needs to be added to the sides of the elevated root mass. Too often plants are observed with the top of the root mass planted in mulch. Mulch settles leaving the root mass exposed. The drying of the upper portions of the root mass contributes to plant decline and causes an unsightly appearance.

Continued on page 15...

*Mulches...**(continued from page 13)*

Girdling Roots

Girdling roots have been a long recognized abiotic problem in both production and landscape systems. Encircling roots due to production methods, poor soil conditions, excessive mulch, and narrow planting sites have contributed in one form or another to the problem. Excessive mulch layers around the base on plants cause new roots to work their way upwards to capitalize on optimal aeration, moisture, and nutrient levels. Roots remain in the mulch layers and encircle as continued topdressing maintains the preferred environment. Mulch layers should be removed periodically and problem roots cut and redirected.

Mulches are an important component in both production and landscape systems. Their use provides a multitude of ecosystem services that contribute to a healthy environment by enhancing aesthetics, enriching our soils and aiding plant growth.

A special thanks to Chris Starbuck, Department of Horticulture, University of Missouri for the use of the tables on the types of mulch.

"Mulches" was originally published in the July/August 2010 issue of The Michigan Landscape magazine, a bimonthly publication of the Michigan Nursery and Landscape Association (MNLA). For information about MNLA, please visit www.mnla.org or call (800) 879-6652.

Pictures from the 2010 Wisconsin Turfgrass Field Day at O.J. Noer Turfgrass Facility

Doug Soldat ,UW-Madison Department of Soil Science, demonstrating a soil moisture probe.

Chris Williamson, UW-Madison Department of Entomology, (under flag 3) talking about the efficiency of Acelepryn and Merit for control of Japanese beetle larvae.

Mark your calendar!

For more information call the numbers listed or 920-391-4653

Aug. 24	Twilight Garden Tour, 4-7 p.m., Spooner Agriculture Research Station, Spooner.
Aug. 26	NR 40 Training: Invasive Plant Identification & Management, 1-4 p.m., Ag & Extension Service Center, 1150 Bellevue St., Green Bay.
Sept. 10-12	Urban and Small Farm Conference, Milwaukee.
Sept. 18	Landscape Industry Certified Technician Test (formerly CLT), MATC, Mequon.
Sept. 24-25	WCTPA Summer Convention, Whispering Pines Tree Farm. For more information call 608-742-8663.
Sept. 27	DNR Urban Forestry Workshop: Tree Pruning Basics, 8:30 a.m.-3 p.m., Green Bay. (See below for all dates and locations)
Oct. 6	New, Better Trees and shrubs for the Residential Garden, 6:30-8:30 p.m., Olbrich Botanical Gardens, Madison. For more information call (608) 246-4550
Nov. 13	Women in Horticulture 2010 Conference, Mount Mary College, Milwaukee. For more information call 414-727-1818

2010 DNR Urban Forestry Workshops:
Tree Pruning Basics

Below are the dates and locations for this year's workshops. Questions regarding registration should be directed to (608) 267-0571.

Sept. 13 Rhinelander
Sept. 14 Spooner
Sept. 15 Chippewa Falls
Sept. 16 La Crosse
Sept. 17 Marshfield
Sept. 20 Milwaukee
Sept. 21 Milwaukee
Sept. 22 Whitewater
Sept. 23 Sun Prairie
Sept. 24 Sun Prairie
Sept. 27 Green Bay
Sept. 28 Appleton
Sept. 29 Oshkosh

Who should attend?

Community forestry, parks and public works employees, managers, tree board members, tree service, nursery and landscape employees, restorationists, friends' groups, and other professionals in the areas of urban forestry and horticulture.

Green Bay Botanical Garden Events

For more information call 920-490-9457

Aug. 25 Garden Walk: Garden Hardscapes
Sept. 11 15th Anniversary Celebration & Art Harvest
Sept. 14 Leaf Casting
Sept. 22 Garden Walk: Ash Alternative Species
Sept. 27 Put Your Garden to Bed

UW Extension

University of Wisconsin, U.S. Department of Agriculture and Wisconsin counties cooperating. An EEO/AA employer, University of Wisconsin Extension provides equal opportunities in employment and programming, including Title IX and American with Disabilities (ADA) requirements.

Brown County UW-Extension
Agriculture & Extension Service Center, 1150 Bellevue St., Green Bay, WI 54302-2259
Phone: (920) 391-4610; Fax: (920) 391-4617; 711 (Wisconsin Relay)
www.browncountyextension.org

About this newsletter

Unless otherwise noted, articles for this newsletter are submitted and/or written by Brown County UW-Extension Horticulture Educator Vijai Pandian. Newsletter layout by Brown County UW-Extension Horticulture Department Secretary, Linda L. Blondin. For additional information contact Vijai by phone at 920-391-4611 or email vijai.pandian@ces.uwex.edu.