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## Landscape Alert

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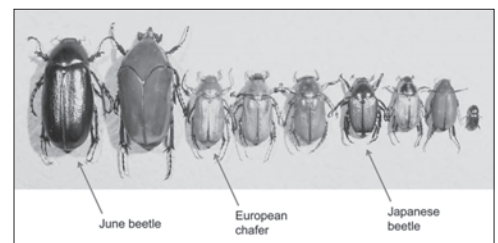
Japanese beetle.

## Now is a good time to see three notorious beetles: European chafer, emerald ash borer, Japanese beetle

Dave Smitley, Entomology

European chafer beetles were very active on warm evenings around dusk in Lansing this past week. Sometimes a few dead ones remained on the sidewalk the next morning. In Lansing, they will be gone soon because they only fly for about a three-week period. Lots of European chafer adults means there could be lots of grubs in low-maintenance turf this fall with the damage most visible from September to November, following periods of dry weather that cause wilting or the turf to go dormant.

Emerald ash borer beetle have also been very active on warm, sunny afternoons. To see the beetles, look up at the leaves of infested ash trees on a warm afternoon from under the tree. Watch for a ragged edge on leaves where they have been feeding, and dark elongate shadows on the undersides of leaves (3/8 to half an



Adult beetles of the most important turf pests. (Dave Shetlar, OSU)



Emerald ash borer.

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inch long) caused by beetles sitting on the tops of leaves. You may see some of the green beetles themselves on low branches at eye level. They

have already reached peak activity in the Lansing area, but some can be found throughout July.

Japanese beetles just started to

emerge over the last two weeks. Activity will increase throughout July, peaking in late July and early August. **IPM**

## Norway maples with wilting branches in Ann Arbor, Plymouth and Canton

Dave Smitley, Entomology

Guerin Wilkinson from Greenstreet Tree Care and Kay Sicheneder, City of Ann Arbor worker, have reported many cases of branch-wilting on Norway Maples and some sugar maples in Ann Arbor, Plymouth and Canton. Here is how they describe the symptoms:

“Everyone at our company (Greenstreet) has noticed an odd thing happening to sugar maples and Norway maples this year. Branches scattered throughout the crowns are dying. Leaves started to come out, then the branches died and discolored with half-sized leaves remain. In the office, I’ve

been getting regular comments from people in the field, plus some phone calls about this. I believe the branches wilted and died soon after pushing out the leaves. We started seeing symptoms early in the season when water stress was not an issue. Yesterday, I reviewed some of the trees that the city of Ann Arbor forestry department told me about. The wilted branches are scattered throughout the crowns. These trees are not in great condition overall, but rather ones more prone to decline due to age and poor site conditions.”

At this point we don’t know the cause of the reported symptoms or

how wide-spread it is across the state. Bob Bricault (MSU Extension, Washtenaw County) and Gerry Adams (MSU Professor of Plant Pathology) will meet Guerin to visit some of these sites next week. Some of things they will be looking for are: *Verticillium* wilt, leaf scorch (but not expected to be bacterial leaf scorch), anthracnose and borer galleries or emergence holes. We will give you an update on what they find in the next *Landscape Alert* issue. Gerry Adams found an old MSU bulletin on “Maple Environmental Stresses” that may be helpful. **IPM**

## Forest tent caterpillars are done for this year, but adults moths to fly soon

Dave Smitley, Entomology

If you read the *Landscape Alert* in June, you know that we had extensive defoliation in Michigan, especially between Cadillac and Traverse City and in that region, from forest tent caterpillar. They are done feeding

now, have pupated, and the adult moths will begin to fly any day now. Many people asked questions about dying caterpillars and the parasitic fly that attacks forest tent caterpillar. Tom Dudek (MSU Extension,

regional horticulture agent) found an excellent article in “Branching Out” from New York State that talks about some of the natural enemies that drive the 4 to 10-year outbreak cycles. **IPM**

## Mimosa webworm damage beginning to appear now

Dave Smitley, Entomology

Over the last five years, we have seen more and more damage to honeylocust trees from Mimosa webworm. It seems that the mild winter temperatures have allowed populations to build to damaging levels. In Lansing, we started to see the first signs of browning that happen when the caterpillars’ web leaflets together with silk and begin feeding. The damage is expected to increase over the next two weeks.

Because imidacloprid is not the best product for caterpillar pests, we are in the process of testing emamectin benzoate (TREE-age) trunk injections to see how effective they are and how long they last. Meanwhile, foliar sprays of carbaryl or a pyrethroid insecticide are still very effective. Unfortunately, last year we saw isolated hot-spots where the honeylocust trees were very heavily (greater than

75 percent) defoliated by mimosa webworm. **IPM**

## Diseases of herbaceous perennials book and CD-rom

Thomas Dudek, Senior District Extension Horticulture and Marketing Educator Ottawa County

*This article was originally posted to the Landscape Alert website on July 2, 2009.*

A new resource is available to landscapers, nursery growers and grounds managers who work with herbaceous perennials and need to identify diseases that impact these plants. *Diseases of Herbaceous Perennials* by Mark Gleason, Margery Daughtrey, Ann Chase, Gary Moorman, and

Daren Mueller is published by The American Phytopathological Society. This full color publication contains easy-to-read information on general types of diseases that attack perennials. Specific sections on 150 popular perennials are arranged alphabetically by plant and accompanied by hundreds of fine color photographs to assist in accurate disease diagnosis.

I believe this book will become

a standard on anyone's bookshelf that is involved with identifying and diagnosing herbaceous perennial diseases. To obtain a copy go to: [www.apsnet.org](http://www.apsnet.org) and scroll down to the APS Press tab on the left. You can also obtain a CD-rom that contains all the images from the book for use in presentations to your staff or clients. This is a "must have." **IPM**

## Landscape Professionals summer field day July 31

Rebecca Finneran, Kent County MSU Extension

Join other landscape professionals on July 31 for a one-day conference at Calvin College in Grand Rapids hosted by the Association of Landscape Professionals and MSU Extension.

The conference will host workshops on pond and stream management, soil practices, sprayer calibration, weed, tree and shrub identification. Registration begins at 7:45 AM and the day will end by 3:00 PM. There

will be lunch and a trade show. Four MDA credits have been applied for. See the brochure for registration and more information. ([www.ipm.msu.edu/cat09land/7-10LandscapePro.pdf](http://www.ipm.msu.edu/cat09land/7-10LandscapePro.pdf)) **IPM**

## Euonymus scale a problem on some Euonymus shrubs and ground covers

Dave Smitley, Entomology

MDA inspectors have discovered more Euonymus scale than usual this spring. Although the traditional treatment, 2 percent horticultural oil

sprayed during crawler emergence is very effective, another product, Distance (an insect growth regulator-type insecticide) is very effective

as a crawler spray and for young armored scales. Although Euonymus scale crawlers have already emerged, Distance should still work well. **IPM**

## European chafer grubs

Dave Smitley, Entomology

European chafer continues to spread and occasionally cause damage to spruce, arborvitae and some other field-grown nursery plants. Discus, Arena, or Flagship

applied in July are most effective for preventing grub problems. Granular formulations remain stable until it rains. Sprayable formulations must be watered-in or covered with soil.

Watch for bark-scraping damage just below the soil line this fall and early next spring. **IPM**

## Yellow nutsedge and irrigation

Kevin Frank, Crop and Soil Sciences

My personal observations of turf stress indicators including how many consecutive days the air conditioning

has been on and is the turf over the septic field brown yet, have been generally absent this summer.

Although many do not consider it a blessing to have high temperatures in the 60's the week prior to the 4<sup>th</sup>

of July weekend, the cool season turf that makes its home in this state has been generally thriving in these weather conditions. Weeds have dominated most of the writings in this column this year as there really haven't been too many other stress maladies to focus on.

Continuing on the weed trend this week, I've been noticing that yellow nutsedge has been popping up in turf. Control options for the homeowner are rather limited; look for products with the active ingredient sulfentrazone. Yellow nutsedge control options for professional applicators include Certainty (a.i. sulfosulfuron) and

Sedgehammer (a.i. halosulfuron). Repeat applications will likely be required to achieve control. As with any herbicide applications at this time of year, be cautious of applications to turfgrass that is under drought or heat stress, even with the relatively cool temperatures, the soil is drying out in many areas and the turf is starting to show some stress. General recommendations are to avoid herbicide applications when temperatures are above 80° F due to the risk of burning the turf.

It's been a great year for irrigation systems as any gaps in coverage have been covered up

by the rain. If the weather pattern gives us some more dry days, poor irrigation uniformity will start to display itself with green and brown circles in the turf where the irrigation is not uniform. It never hurts to actually watch the irrigation system every now and then and not just assume it's working perfectly. Soil differences across an area can result in visual differences in turfgrass very similar to those seen with poorly functioning irrigation systems. Although we would all like to think we have a very uniform soil type to grow our turf and landscape plants in, that is often not the case. **IPM**

## Christmas tree insect update for July 10

Jill O'Donnell, Christmas Tree ICM educator

### Scout now for gypsy moth

Even though the gypsy moth spray window is closed or closing for many counties in the Lower Peninsula, growers need to be walking their fencerows and scouting their plantations (especially spruce) for signs of gypsy moth. This is the time of the year we are particularly concerned with the large larvae that have nearly completed their feeding and they begin to crawl around, looking for a dark, protected place to pupate.

When the female moths emerge from the cocoons, they cannot fly. That means that there is a real good chance that they will lay their eggs right on the tree. Taking the time now to scout your fields may mean you avoid having the plantation restricted this fall.

### Spruce bud scale hatching

The small, pinkish crawlers are now beginning to hatch on Norway and Colorado Blue Spruce. These look very similar to the crawlers of pine tortoise scale. The best time to spray is when almost half of the crawlers have emerged. Ladybugs feed on these crawlers and can control light infestations.

### Pine chafer (Anomela beetle)

This year, we are again seeing large populations of pine chafer feeding on the new needles of Scotch and white pine. The adult beetles are about a third of an inch long, tawny to brownish-green. These beetles damage the new needles by gnawing through the needle sheaths. These needles then will bend over, turn brown and eventually drop, giving the trees a ragged appearance. I've noticed that the east side of the tree tends to have more damage. If you need to control these beetles, treat with a registered insecticide when you find the beetles feeding, but before they cause too much damage.

### Pine needle scale – second hatch

Growers in the southern half of the Lower Peninsula should start watching for the hatch of second generation crawlers of pine needle scale. Recent research by Dr. Deb McCullough indicates that the summer generation eggs can begin hatching at roughly 1,280 GDD50 (usually early to mid-July). In most years, the summer generation eggs continue to hatch over a relatively long time period of two to four weeks. This extended period of

hatching probably occurs because the spring generation scales develop at different rates during May and June. Some scales develop relatively quickly because they are exposed to more sun and warmer temperatures than scales that feed in shaded locations on the tree. The newly hatched crawlers move onto the expanding shoots and feed primarily on the current-year needles. These scales mature and lay eggs late in the summer, then die. Their eggs overwinter under the white armor until the following spring.

The ideal window for applying insecticides to control the summer generation eggs generally occurs at around 1,500 GDD50. Spraying after nearly all eggs have hatched and most crawlers are in the hyaline stage should achieve good control. Applying an insecticide after scales have produced the hard, white armor will not be effective because scales and even scale eggs are well protected by the white armor.

**Note:** Growers will want to use caution or avoid applying pesticides with the current hot, humid and dry weather conditions because of the increased potential for phytotoxicity.

Make sure to read the pesticide label for any precautions.

### Sawflies

Keep an eye out for sawflies on your conifers. Larvae of several sawfly species feed in late June through late July. Watch for **yellowheaded spruce sawfly** on young, open-grown white spruce; **larch sawfly** on larch (tamarack) trees; **balsam fir sawfly** on balsam

and Fraser fir and **redheaded pine sawfly** on red, Scotch and jack pine. Sawfly larvae are often mistaken for caterpillars, but are actually a primitive group of insects related to wasps and bees. The larvae usually feed in colonies of 10 to 50 individuals and typically eat all of the needles or leaves from a single branch. The adult is a brownish or black fly-like, non-stinging wasp. When populations are high, these

summer feeding sawflies can cause serious defoliation because they eat both new and old foliage. Most sawfly populations are controlled by parasitoid wasps, and the wasps will be very susceptible to any insecticide that you use.

Note that Btk, a product often used to control leaf-feeding caterpillars, will not be effective on the sawfly larvae. **IPM**

## Why are there worms in my swimming pool?

Fred Warner, Diagnostic Services

*This article was originally posted to the Landscape Alert website on July 2, 2009.*

Often during the late spring and summer, we receive samples of worms people have collected from their swimming pools. These worms measure up to 14 inches in length and are usually tan to dark brown in color. Their occurrence obviously concerns people. However, if you experience this phenomenon don't fret, almost always, these are horsehair or Gordian worms. They are parasites of some insects, but do not harm mammals.

Horsehair worms develop as parasites in the bodies of grasshoppers, crickets, cockroaches and some beetles. When mature,

they leave their hosts to mate and lay eggs. This occurs in water, so they are often found in puddles, ponds, livestock watering troughs, swimming pools or any container with water. In water, these worms wiggle slowly, often contorting their bodies into intricate knots. They are called horsehair worms because they resemble the hairs of horses' manes or tails and are often found in areas where horses drink. It was believed as these hairs fell into water, they came to life.

Adult worms mate in water and females lay long gelatinous strings of millions of eggs. The eggs hatch usually within a few weeks and the young nematodes crawl onto vegetation near the water's edge

to be consumed by crickets or grasshoppers. It is believed as the nematodes mature inside their hosts' bodies and get ready to emerge, the insects become very thirsty, thus seeking out water. If they jump into your swimming pool, the result is one to several horsehair worm adults swimming around the pool.

Since horsehair worms are harmless, except to insects, no control is necessary. For identification, worms can be collected and placed in sealed containers with water or preferably alcohol and delivered or mailed to MSU Diagnostic Services. There is a \$10.00 fee for their identification. **IPM**

## The summer of our discontent

Michael Kaufman, Entomology

*Editor's note: This article was revised by Dave Smitely, MSU Entomology and was first published in the August 8, 2008 Landscape Alert.*

Although substantial rains have subsided in the past few weeks, mosquito populations are still reaping the benefits from wet spring and early summer periods. I'd considered last year one of the worst in my locale in the past decade, but this year has probably equaled that. Why is this so, what can you do

about it, and what might it mean for mosquito-borne disease risks?

The simple explanation is that regular rain events earlier in the year both induced hatching and sustained larval habitats. In my area, there were several storms that produced over an inch of rain. This has helped launch broods of summer floodwater mosquitoes (e.g., *Aedes vexans* and *A. trivittatus*). In June and to some extent even now, these species overlapped with remaining spring emerging species (recall our

wet spring) to create a large crop of nuisance biters. Additionally, a cattail marsh species, *Coquilletidia perturbans* that normally starts to peak around July 4 has added to the problem in some areas.

Large floodwater mosquito populations often result from the hatching of eggs laid several years ago. Think of them as mosquito "seeds." The eggs are laid in ground depressions that may not hold standing water every year. When we get large rain events in the summer,

these habitats produce mosquitoes from the “seed bank” to add to the normal background populations. I’m pretty sure this occurred in many parts of Lower Michigan last year and this robust population laid eggs that hatched this year. The main culprit in my area this year, *A. trivittatus*, is a small, aggressive mosquito that will bite during the day and often attacks in swarms. It commonly breeds in flooded areas next to streams and rivers, but can also exploit other wetland habitats. Many flood zones contained standing water long after the normal spring peak this year. Coupled with hot weather a few weeks ago, these environments were ideal production centers for *A. trivittatus*. Had summer temperatures not been a bit cooler than normal, we would have experienced this mosquito plague even earlier. If continual cycles of flooding and drying occur during a single summer, the floodwater mosquitoes such as *A. trivittatus* can continually breed (multiple generations each year) and maintain these intolerable levels. The good news is that large, flooding rainfall events appear to be diminishing, so many larval habitats will disappear and adult populations will wane. Additionally, temperatures appear to be moderate thus far, and this will further delay the next onslaught. However, another series of storms with heavy rainfall and more typical summer temperatures could very well continue the outbreak. Since we’re heading into the part of summer when species from permanent water bodies are also beginning to peak, our misery index could easily rise again.

One of the indicators of summer floodwater populations is the appearance of a very large species (largest in Michigan) commonly called “gallinippers.” This is *Psorophora ciliata* and it can be alarming when it lands on your arm to attempt to feed. Adult females can be over ½ inch long in body length

and they have very hairy legs with yellowish bands. They are never very abundant, but you won’t forget them if one tries to bite you. On the positive side, their larvae feed upon other mosquito larvae, so they have a beneficial aspect.

How does one deal with the onslaught of summer species? Unfortunately, when they’ve reached the adult stage in large numbers, options are few. There are many effective backyard spraying/fogging treatments that typically use a synthetic pyrethroid (e.g., permethrin) as the active ingredient. Some can be sprayed at yard borders and have residual (several weeks) effect. Obviously, you will want to strictly adhere to application instructions and restrictions. Pyrethroids have low mammal and bird toxicity, but overspray into ponds, for example, might harm fish. Note also that these compounds are not mosquito specific, so most other insects will be affected. A commercial option that should be avoided is the timer-based automatic sprayers. These units (called “Mosquito Mistors”) are analogous to automatic sprinkler systems and simply spray or mist insecticide from a reservoir at the determined time intervals from a series of nozzles placed in and around the property. This system is costly, inefficient, and violates the sound principles of integrated pest management. If mosquito problems on your property are severe enough for you to consider such a system, I suggest that you contact a mosquito control company instead. Consider hiring a service as part of a neighborhood group – mosquitoes can and will move around frequently from yard to yard. Some of the floodwater species are known to travel miles in search of hosts.

If you’re like me and prefer not to deal with broad-spectrum adulticides, then your options lie in avoidance (stay inside!) and the judicious use of repellents. Spending

the evening on your deck or patio can also be made more tolerable with some well-placed fans. There is an increasing variety of mosquito repellants available that can be applied to exposed skin and many common fabrics (cotton and nylon are OK, but certain synthetics such as rayon may not hold up to higher concentrations of DEET). DEET-based products remain the standard for effectiveness and safety, but relatively new products with picaridin (supposed to be less irritating than DEET, sold as Cutter Advanced) or lemon-eucalyptus oil derivatives (a Repel product) are quite effective. Other products based on botanical derivatives (e.g., Bite Blocker with soybean oil) can be effective for short periods of time, but if you want something to last for more than 2 hours after application and to work for ticks as well as mosquitoes, use one of the products mentioned above. There are also several lines of clothing impregnated with permethrin (e.g., Buzz Off) that keep mosquitoes from landing on materials. You can also apply this to several types of fabrics yourself and it’s supposed to last through several washings. Note that this is the same principle used in bednets to fight malaria in Africa, but also note that the clothing doesn’t provide a whole body shield. Mosquitoes will readily land and bite on exposed skin adjacent to the material.

A recently available personal barrier repellent, OFF clip-ons, also uses a pyrethroid type of insecticide (metofluthrin) dispersed with a small fan as a repellant. I recently tried using one of these units, but it was ineffective against the swarms of *A. trivittatus* that attacked my dog and me when we walked near the edges of the lawn or along country roads. It did appear to inhibit landing/biting attempts when I used it while sitting on the patio, but it did not eliminate repeated mosquito attacks to my head, face, and lower legs. I doubt most people will want to

wear three of these units for full “coverage” and I suspect no one will want to wear one as a necklace to keep *A. trivittatus* away from the head and neck – the packaging label warns against inhalation of the vapors (something that’s probably hard to avoid, in my estimation). Unfortunately, there are no great options for barrier repellants yet. Landscaping plants and citronella candles have not been shown to be more effective than smoke producing candles in keeping mosquitoes at bay. However, research of area-wide repellants is a hot area, so expect to see more products of this type in the next few years.

I’d love to be able to recommend attracting bats as a means to reduce mosquito populations, but the idea that they are mosquito-eating machines is simply a myth. Of course they can and do eat mosquitoes, but they almost certainly could not survive by doing so. The myth arose from a study that reported bats would need to eat several thousand mosquitoes (or mosquito-sized insects) a night to meet energy demands, and from counts of mosquitoes eaten by bats in cages where they were the only prey item. Any accounts of bats controlling mosquito populations are anecdotal, as are those indicating birds such as purple martins are effective. You should also be aware that there’s been a spike in the numbers of rabies-positive bats in recent years, so it’s hard to recommend any practice that would increase the potential for contact with these creatures.

Likewise, it would be nice to be able to recommend propane-powered devices such as Mosquito Magnets that attract and kill mosquitoes via carbon dioxide (sometimes with an octanol supplement) plumes and a fan. However, there is no evidence that they reduce biting rates in a realistic setting and in fact may be drawing in mosquitoes from other areas. The running joke is that if you

want these traps to work for your yard, buy one for your neighbor. They are also not equally effective in trapping all species – we know this from our own mosquito traps that are based on the same attractants. The only study showing substantial reduction in biting rates after use of these devices took place on a very small island with a well-defined mosquito population.

The standard dogma about eliminating breeding sites on your property (eliminating or frequently changing any standing water such as that in birdbaths) still holds true, but it will have little effect on the crops of floodwater mosquitoes that have been the bane of this summer thus far. As mentioned, most of the mosquitoes biting you during the day while you’re trying to weed your garden, or in the evening when you’re relaxing on the patio, have developed elsewhere and have potentially flown into your backyard (unless you live along a floodplain) from miles away. This is not to say that your efforts to eliminate breeding sites are useless. The artificial containers around your home can be excellent larval habitats for many of the species that transmit human diseases.

The large populations of nuisance mosquitoes seen this summer do not necessarily portend an increase in risk of mosquito-borne disease. Some floodwater species appear to be competent vectors of West Nile virus (WNV), for example, but it’s thought their role is minor. They have, however, been implicated in transmission of dog heartworm, so make sure your pets are current with their medications. The primary vectors of West Nile, species of *Culex* mosquitoes, do not appear to be in unusual abundance this year and our testing of mosquito pools for WNV and other mosquito-borne viruses have not yielded a single positive from Michigan samples. It may simply be that the disease is slower to emerge this

year because of climate conditions or bird population factors. WNV and similar diseases tend to be more pronounced in hot, dry years and I wouldn’t characterize the first half of our summer as such. The same conditions (heavy rains) that encourage high populations of floodwater mosquitoes may be washing out some larval habitats (e.g., storm water catchbasins) of the *Culex* species. However, be aware that late summer is usually when *Culex* populations peak, and they also appear to be more likely to feed on humans during this period. Although the risk may be relatively low this year, I’d still urge precautions and the use of repellants, particularly during the evening and nighttime hours.

In the area of “what’s new” for mosquitoes in Michigan, you’ll be happy to know that we have a recently established invasive species. *Ochlerotatus (Aedes) japonicus* actually arrived here in about 2003 (1998 in the eastern United States) and we’ve been tracking its progress in certain areas. It’s a medium-large mosquito with distinctive markings but isn’t necessarily an aggressive biter. Its original range is Japan/northern Asia, and can easily overwinter in our climate in contrast to other invasive mosquito species such as the Asian tiger mosquito. It appears to be a highly competent vector of WNV and similar diseases, and we know it feeds on birds and mammals, including humans. The reason I point it out here, is that it seems very well-adapted to breeding in artificial containers around human dwellings, with a particular fondness for plastic. I’ve found it in buckets, dog dishes, kiddie pools, artificial ponds (with plastic or concrete liners) and a number of miscellaneous containers. In some cases, it appears to be displacing native mosquitoes including *Culex*. We don’t know its role in any disease cycle yet, but it’s clearly one to watch in the event of any

new disease introduction into North America. If anyone notices large larvae in plastic containers around the house or yard, please place a few in alcohol (rubbing alcohol is fine) and send them to me:

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**Weather news**

Aaron Pollyea, Geography

The **6 to 10 day** forecast, July 15 through July 19, suggests that temperature probabilities will be lower across the entire state. Precipitation probabilities will be higher in the southern part of the

Lower Peninsula, but more normal for the rest of the state. The **8 to 14 day** forecast, July 17 to July 23, shows generally the same pattern. Temperatures will be lower than normal across the state with a

higher chance of precipitation in the southern Lower Peninsula. The major difference is a lower than normal chance of precipitation in the western Upper Peninsula. **IPM**

Michigan State University Cooperative Agricultural Weather Service  
 Cumulative Precipitation Summary For 07/09/2009

STATION	DIST	PRECIPITATION TOTALS SINCE													
		07/03/2009 (last week)	06/26/2009 (last 2 weeks)	06/12/2009 (last 4 weeks)	04/01/09 (since Apr. 1)	Actual	Dev.	Norm.	Actual	Dev.	Norm.	Actual	Dev.	Norm.	
HOUGHTON	WU	0.00	1.11	-0.45	3.24	-0.06	7.36	-2.81	0.02	0.57	-0.99	1.46	-1.84	7.67	-2.50
IRONWOOD	WU	0.02	0.57	-0.99	1.46	-1.84	7.68	-2.49	0.00	0.23	-1.33	0.43	-2.87	8.88	-1.29
MARQUETTE	WU	0.00	1.66	-0.03	1.69	-1.43	9.16	-0.45	0.00	0.20	-0.03	1.69	-1.43	9.16	-0.45
STEPHENSON	WU	0.03	1.24	-0.45	1.72	-1.40	7.56	-2.05	0.01	1.13	-0.37	1.71	-1.14	9.62	0.41
BEULAH	NWL	0.02	0.98	-0.52	1.34	-1.51	10.96	1.75	0.06	1.08	-0.42	1.15	-1.70	5.41	-3.80
LAKECITY	NWL	0.06	1.08	-0.42	1.15	-1.70	5.41	-3.80	0.03	1.36	-0.01	1.74	-1.00	9.28	0.27
PELLSTON	NWL	0.00	0.46	-0.91	0.63	-2.11	9.61	0.60	0.00	0.46	-0.91	0.63	-2.11	9.61	0.60
ALPENA	NEL	0.21	0.90	-0.47	1.29	-1.45	8.97	-0.04	0.04	0.71	-0.66	1.03	-1.71	8.73	-0.28
HTNLAKE	NEL	0.04	0.71	-0.66	1.03	-1.71	8.73	-0.28	0.00	0.23	-1.01	1.07	-1.43	8.86	-0.61
ROGERCITY	NEL	0.00	0.65	-0.59	0.90	-1.60	9.88	0.41	0.00	0.65	-0.59	0.90	-1.60	9.88	0.41
VANDERBILT	NEL	0.00	0.30	-0.94	1.99	-0.51	9.88	0.41	0.00	0.30	-0.94	1.99	-0.51	9.88	0.41
FREMONT	WCL	0.04	0.34	-1.13	1.84	-1.23	9.95	-0.11	0.00	0.04	-1.13	1.84	-1.23	9.95	-0.11
LUDINGTON	WCL	0.00	1.15	-0.25	3.23	0.35	11.77	2.64	0.00	1.15	-0.25	3.23	0.35	11.77	2.64
LUDINGTON	WCL	0.00	0.77	-0.63	2.31	-0.57	10.26	1.13	0.00	0.77	-0.63	2.31	-0.57	10.26	1.13
MUSKEGON	WCL	0.00	1.25	-0.34	5.39	2.14	14.25	3.34	0.00	1.25	-0.34	5.39	2.14	14.25	3.34
BI GRAPIDS	CL	0.00	0.20	-1.39	5.49	2.24	13.18	2.27	0.00	0.20	-1.39	5.49	2.24	13.18	2.27
SAGINAW	ECL	0.00	0.30	-1.29	8.54	5.29	19.60	8.69	0.00	0.30	-1.29	8.54	5.29	19.60	8.69
STANDISH	ECL	0.00	0.10	-1.49	2.91	-0.34	12.25	1.34	0.00	0.10	-1.49	2.91	-0.34	12.25	1.34
GRAPIDS	SWL	0.00	0.11	-1.48	2.45	-0.80	11.62	0.71	0.00	0.11	-1.48	2.45	-0.80	11.62	0.71
GULLAKE	SWL	0.00	0.13	-1.54	2.61	-0.77	11.86	1.18	0.00	0.13	-1.54	2.61	-0.77	11.86	1.18
HOLLAND	SWL	0.00	0.15	-1.52	2.69	-0.69	12.85	2.17	0.00	0.15	-1.52	2.69	-0.69	12.85	2.17
SOUTHBEND	SWL	0.00	0.31	-1.36	3.68	0.30	15.15	4.47	0.00	0.31	-1.36	3.68	0.30	15.15	4.47
WESTLIVE	SWL	0.00	0.16	-1.41	3.95	0.72	13.26	2.87	0.00	0.16	-1.41	3.95	0.72	13.26	2.87
ALBION	SCL	0.00	0.53	-1.04	5.08	1.85	14.84	4.45	0.00	0.53	-1.04	5.08	1.85	14.84	4.45
COLDWATER	SCL	0.00	0.65	-0.92	4.76	1.53	13.42	3.03	0.00	0.65	-0.92	4.76	1.53	13.42	3.03
LANSING	SCL	0.00	0.00	-1.57	0.00	-3.23	0.00	-10.39	0.00	0.00	-1.57	0.00	-3.23	0.00	-10.39
DETROIT	SEL	0.00	0.60	-0.97	5.76	2.53	10.20	-0.19	0.00	0.60	-0.97	5.76	2.53	10.20	-0.19
FLINT	SEL	0.00	0.15	-1.42	2.53	-0.70	11.92	1.53	0.00	0.15	-1.42	2.53	-0.70	11.92	1.53
MILFORD	SEL	0.00	0.07	-1.50	3.09	-0.14	11.52	1.13	0.00	0.07	-1.50	3.09	-0.14	11.52	1.13
MICLEMENS	SEL														
ROME	SEL														
TIPTON	SEL														
TOLEDO	SEL														

Report generated at 09:34, 07/10/09



ACTUAL AND PREDICTED DEGREE-DAY  
ACCUMULATIONS SINCE MARCH 1 2009 (\*)

STATION OR DISTRICT	BASE 42 BE DEGREE-DAYS				BASE 50 BE DEGREE-DAYS			
	AS OF 2008	07/09 2009	BY 07/14	BY 07/19	AS OF 2008	07/09 2009	BY 07/14	BY 07/19
WEST UP NORMS**		1282	1404	1530		757	839	926
HOUGHTON	991	933	1011	1138	514	478	525	606
IRONWOOD	1145	1178	1276	1436	633	651	715	825
MARQUETTE	1099	1005	1089	1225	611	531	584	673
STEPHENSON	1347	1279	1386	1560	792	732	804	928
EAST UP NORMS		1095	1210	1329		595	670	751
CHATHAM	1028	984	1074	1213	582	513	572	664
SSMARE	1134	1052	1148	1297	598	536	597	694
N. W. LP NORMS		1449	1578	1710		873	964	1058
BEULAH	1504	1426	1532	1708	889	810	881	1006
LAKECITY	1427	1325	1423	1587	851	749	815	930
PELLSTON	1356	1152	1237	1380	797	646	703	802
N. E. LP NORMS		1403	1533	1664		835	925	1016
ALPENA	1435	1244	1338	1493	852	694	757	864
HTNLAKE	1504	1350	1452	1621	903	754	822	939
ROGERCITY	1398	1272	1368	1527	815	709	773	883
VANDERBILT	1379	1226	1319	1472	820	686	748	854
W. CENT. LP NORMS		1614	1750	1889		996	1093	1192
FREMONT	1607	1600	1716	1887	975	935	1019	1142
LUDINGTON	1419	1384	1484	1632	819	760	828	928
MUSKEGON	1626	1725	1850	2034	971	1030	1123	1258
CENT. LP NORMS		1684	1824	1966		1054	1154	1257
BI GRAPIDS	1583	1528	1633	1799	977	901	975	1094
E. CENT. LP NORMS		1684	1826	1971		1056	1158	1263
SAGINAW	1776	1659	1784	1984	1119	975	1066	1217
STANDISH	1502	1413	1519	1690	915	805	880	1005
S. W. LP NORMS		1870	2019	2172		1193	1302	1415
GRAPIDS	1867	1888	2006	2194	1187	1164	1249	1389
GULLLAKE	2133	2056	2184	2389	1407	1292	1387	1542
HOLLAND	1839	1939	2060	2253	1167	1211	1300	1445
SOUTHBEND	1974	2051	2179	2383	1269	1299	1394	1551
WESTLIVE	1675	1736	1844	2017	1026	1051	1128	1255
S. CENT. LP NORMS		1841	1988	2139		1177	1284	1395
ALBION	1818	1807	1922	2108	1143	1099	1182	1320
COLDWATER	1809	1914	2036	2232	1131	1189	1279	1429
LANSING	1828	1776	1889	2071	1153	1058	1138	1271
S. E. LP NORMS		1822	1970	2122		1157	1265	1377
DETROIT	2029	1991	2116	2318	1300	1222	1313	1464
FLINT	1880	1716	1824	1998	1202	1017	1093	1218
MILFORD	1663	1653	1757	1924	1023	967	1039	1158
MICLEMENS	1787	1814	1928	2112	1122	1094	1176	1311
ROMEO	1763	1676	1782	1951	1094	992	1066	1188
TIPTON	1824	1804	1918	2100	1138	1094	1176	1311
TOLEDO	1966	2032	2160	2365	1260	1268	1363	1519

\* Since weather data for some agricultural stations are not available prior to April 1st, GDD values for those stations during February and March are estimated with closest available station data.

\*\* District normals were calculated as the mean of daily GDD totals at several stations within each district for the period 1951-1980.



## Crop Advisory Team Alerts

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