Crop Advisory Team
Alert
MICHIGAN STATE UNIVERSITY EXTENSION
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Field Crop Advisory Team Alert

In this issue

Last issue for 2009

This is the final issue for the 2009 season of the *Field Crop CAT Alert* newsletter. Included in this issue is an index of articles to help guide readers through the topics covered this year. Educators and specialists have worked hard to inform readers about current issues and crop production throughout the last few months.

We will continue to publish timely articles at the *Field Crop CAT Alert* web site: http://ipmnews.msu.edu/fieldcrop. Interested in staying informed via email notification? Send an email to catalert@msu.edu with your full name and note that you wish to subscribe to the field crop edition. At the *Field Crop CAT Alert* web site, you can also sign up to received RSS feeds when new articles are posted. (See image.)

Look for a bright orange RSS feed logo on the right side of the web page.

We love to hear feedback from our readers. Do you have a comment or suggestion? Please send it to catalert@msu.edu or mail it to the address on the back of this newsletter. Indicate whether you are referring to our fruit, vegetable, field crop or landscape edition.

Thank you. - Joy Landis, editor and Andrea Buchholz, asst. editor

Ten fundamentals everyone should know about bioenergy: Part 8

Kurt Thelen, Crop and Soil Sciences

Fundamental #8: Bioenergy feedstock crops have a wide range of energy efficiency ratings.

This is the eighth in a series of articles on bioenergy. The previous installment focused on the need to have a broad range of bioenergy crops available to best fit local growing conditions, markets, biorefinery needs and environmental constraints. This article will focus on the inherent variability in the energy efficiency of various bioenergy feedstock crops. Biofuels have the potential to be cost competitive with fossil fuels. One metric used to compare the efficiency of a particular bioenergy feedstock crop is based on the amount of energy the crop produces in its final fuel form compared to the cost of the feedstock. This metric is expressed as dollars per giga-Joule of energy produced ($ per GJ). For reference, a GJ is equivalent to 0.948 million Btu.

Recently, scientists (Lynd et al., 2008) estimated the cost of liquid transportation fuels derived from cellulosic feedstocks to be at $3.00 per GJ compared to $8.70 for gasoline. Additionally, the authors project costs of $13.80 and $6.60 per GJ for soy biodiesel and corn grain ethanol respectively. Determining the best feedstock for biofuel production is confounded by several issues. A wide disparity between reported economic and energy input costs exists in the literature. My own experience in working with farmers the past 20 years has shown a tremendous diversity in management between farms and even between years for the same farm. Decisions on which tillage operations to perform, which and how much fertilizer, pesticide, and seed traits to use are often based on a myriad of temporal economic, climatic, and environmental factors and interactions.

Biological systems, including farming, are naturally fraught with variability. Therefore, significant variability in the cost per GJ of bioenergy produced will continue to be observed. However, some generalizations can be made. When comparing enterprise cropping budgets for input costs and energy requirements, several items consistently rank near the top. These include nitrogen fertilizer, seed, and field machinery operations. Therefore, cropping systems that minimize these primary input cost items while maintaining yield will generally result in being more efficient on a cost per GJ of bioenergy produced basis. For example, perennial grass crops such as switchgrass have the potential for lower cost per GJ produced by virtue of their perennial life cycle (lower planting costs since a stand will last about 10 years) and lower nitrogen fertilizer costs (perennials will translocate some nutrients to root system in fall) compared to an annual grass crop such as corn. On soils responsive to reduced tillage, switching to no-till management can improve economic and energy returns with annual crops such as corn. Furthermore, the efficiency of annual crop systems can be improved by double-cropping a winter annual biomass crop such as winter cereal rye, with corn or soybean.

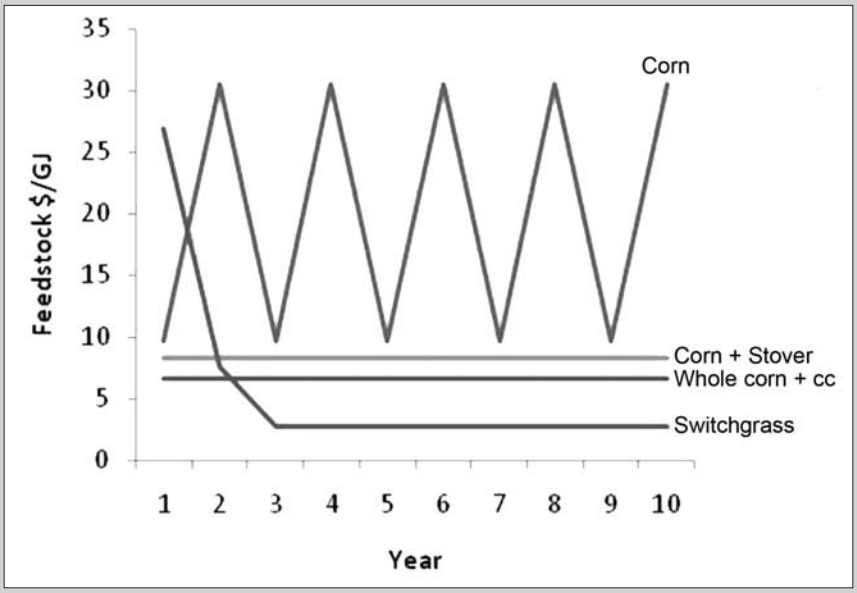

Figure 1 shows the estimated $ per GJ cost for several bioenergy crop feedstocks grown under Michigan conditions. To date, oilseed feedstocks for biodiesel such as soybean have tended to be less competitive than starch feedstock for ethanol when evaluated on an energy metric such as $ per GJ. This is primarily due to competition for oilseed feedstock from food markets which drives the price for the feedstock up. Additionally, the value of a co-product is not generally factored into an energy-based metric such as $ per GJ. Because soybean is considered more of a protein crop than a bioenergy crop, it tends to compare less favorably with other crops when measured on its energy value alone without regard to the value of the soymeal protein co-products.

References

Lynd et al. 2008. How biotech can transform biofuels. Nature Biotechnology 26:169-172. **IPM**

Free herbicide-resistant weed screening for Michigan soybean producers

Christy Sprague, Crop and Soil sciences

Glyphosate-resistant weeds continue to be of growing concern for growers, particularly since several different glyphosate-resistant weeds have been identified in the states surrounding Michigan. Weeds that often escape control in Roundup Ready fields include horseweed (marestail), common ragweed, giant ragweed, and common lambsquarters. While not all weeds that escape control are resistant, it is important to identify the cause of the lack of control. Currently, horseweed is the only weed that we have confirmed resistant to glyphosate in Michigan. Other weeds, for example common ragweed and giant ragweed, have been confirmed resistant to glyphosate in other states in the Midwest.

Confirming herbicide-resistant weed populations is the first step of any resistance management program. Confirmation of resistance will provide growers with the knowledge to implement the best possible management strategies with the ultimate goal of preventing or limiting the spread of herbicide-resistant weeds.

Because of the many benefits that glyphosate offers Michigan soybean growers and the high potential for selecting for glyphosate resistance, MSU's Diagnostic Services with funding provided by the Michigan Soybean Promotion Committee has an ongoing herbicide resistance screening program that was started in 2003. Diagnostic Services will conduct free glyphosate-resistance screening for soybean producers that feel they may have glyphosate-resistant weeds. All samples will be screened for glyphosate resistance as well as resistance to ALS-inhibiting and triazine herbicides.

How do I get my weeds screened for resistance?

The process is very simple. All you need to do is collect seedheads from mature plants in late summer to early fall following appropriate guidelines listed in the weed resistance submittal form available at MSU Extension county offices and agricultural retail facilities. Please document herbicide and cropping

histories. Clip several seedheads and place them in a paper bag (do not use a plastic bag). These samples can be mailed to:

Michigan State University
Attn: Resistance Screening
Diagnostic Services
101 Center for Integrated Plant Systems
East Lansing, MI 48824-1311

Note: both common and giant ragweed seeds are found in the leaf axils. They are not found at the very top of the plant. If you have any questions about field criteria or seedhead collection, please call Christy Sprague at 517-355-0271 ext. 1224 or by email at sprague1@msu.edu. **IPM**

Harvest-aid options in soybean

Christy Sprague, Crop and Soil sciences

Late-season rains and later than normal canopy closure have led to several weedy soybean fields. These weeds can lead to difficulties with harvest if stems or leaves are still green. Frost usually helps desiccate these weeds, however if soybeans are ready to be harvested before weeds have dried down, there are a few herbicide options that growers can use as harvest aids to help desiccate or dry down "green" stem and leaf tissue. Currently, there are three different herbicide options labeled in Michigan for preharvest applications in soybeans. These herbicides are glyphosate (Roundup and several other formulations), Gramoxone Inteon 2SL (paraquat and other formulations), and Aim 1.9EW (carfentrazone). Differences in these products include the speed of activity, preharvest intervals, and effectiveness.

Glyphosate (several formulations) is the most effective herbicide for broad-spectrum weed desiccation followed closely by Gramoxone Inteon of the herbicides labeled for preharvest application. Glyphosate is a systemic herbicide, so it generally takes 10 to 14 days after application for maximum activity. Even though most soybean fields are Roundup Ready, glyphosate should not be applied until soybeans are **mature** and have lost all of their color. Earlier applications may result in glyphosate residues being found in the harvested beans. There is a **seven-day preharvest restriction** between glyphosate application and soybean harvest. **DO NOT** use glyphosate as a harvest aid for soybeans that are grown for seed. There are several glyphosate formulations that are labeled for preharvest applications in soybean, and the maximum use rate is often dependent on the product. It is important to examine the individual product labels to find the maximum labeled rate that can be used. In most cases, the use rate of ***0.75 lb ae/A***, which is equivalent to 22 fl oz/A of Roundup WeatherMax and Roundup PowerMax or 24 fl oz/A of Durango DMA and Touchdown Total or 32 fl oz/A of a 3 lb ae/gal glyphosate formulation will generally desiccate most annual weeds. Ammonium sulfate (***AMS***) at 17 lb/100 gal should always be added, regardless of glyphosate formulation.

Gramoxone Inteon 2SL (paraquat) can also be used as a harvest-aid to help desiccate uncontrolled weeds that may interfere with harvest. Gramoxone Inteon has generally been shown as the herbicide with the quickest speed of activity. Gramoxone Inteon is a contact herbicide so desiccation is dependent on good spray coverage. The **use rate** of Gramoxone Inteon is **12 to 16 fl oz/A**. A non-ionic surfactant **(NIS)** at 0.25 percent v/v or crop oil concentrate (COC) at 1 percent v/v must be applied with Gramoxone Inteon. The application timing for Gramoxone Inteon is when at least 65 percent of the soybean (indeterminate varieties) pods are mature brown (seed moisture less than 30 percent). **DO NOT** apply Gramoxone Inteon within **15 days** of harvesting soybean. Gramoxone Inteon is also a **restricted-use pesticide**, so a private or commercial pesticide applicator's license is required for use of this product.

Aim 1.9EW (carfentrazone) is another option that may be used as a harvest aid. However, the spectrum of weed desiccation is not as broad as the other herbicides labeled for this purpose. Aim is also a contact herbicide so desiccation is dependent on good spray coverage. Aim should be applied to mature soybean once pods have lost all their color. The Aim **use rate** is **1 to 1.5 fl oz/A** and Aim should be applied with 1 percent v/v COC or a methylated seed oil. The **preharvest interval** for Aim is **three days**. **IPM**

Estimating grain yields in corn

Ned Birkey, Southeast Michigan MSU Extension educator

Editor's note: This article was adapted by Ned Birkey from an Ohio State C.O.R.N newsletter article by Peter Thomison.

With USDA predicting a corn yield for Michigan of 146 bushels per acre, many Michigan farmers will probably be interested in conducting preliminary yield assessments of their corn fields. Fields planted in late May and June are more likely to be affected by dry weather. In upcoming weeks, corn growers with drought stressed fields may want to predict grain yields prior to harvest in order to help with marketing and harvest plans.

While examining ears to determine potential grain yield, growers may encounter various ear development problems that may impact yield at harvest. Troubleshooting these corn ear disorders now, rather than at harvest, may give growers more time to diagnose likely causes of these problems.

Two procedures that are widely used for estimating corn grain yields prior to harvest are the **Yield Component Method** (also referred to as the "slide rule" or corn yield calculator) and the **Ear Weight Method**. Each method will often produce yield estimates that are within 20 bu/ac of actual yield. Such estimates can be helpful for general planning purposes.

The **Yield Component Method** was developed by the Agricultural Engineering Department at the University of Illinois. The principle advantage to this method is that it can be used as early as the milk stage of kernel development, a stage many Ohio corn fields have probably achieved. The yield component method involves use of a numerical constant for kernel weight which is figured into an equation in order to calculate grain yield. This numerical constant is sometimes referred to as a "fudge factor" since it is based on a predetermined average kernel weight. Since weight per kernel will vary depending on hybrid and environment, the yield component method should be used only to estimate relative grain yields, i.e. "ballpark" grain yields.

When below normal rainfall occurs during grain fill (resulting in low kernel weights), the yield component method will **overestimate** yields. In a year with good grain fill conditions (resulting in high kernel weights), the method will **underestimate** grain yields.

Step 1. Count the number of harvestable ears in a length of row equivalent to 1/1000th acre. For 30-inch rows, this would be 17 ft. 5 in.

Step 2. On every fifth ear, count the number of kernel rows per ear and determine the average.

Step 3. On each of these ears count the number of kernels per row and determine the average. (Do not count kernels on either the butt or tip of the ear that are less than half the size of normal size kernels.)

Step 4. Yield (bushels per acre) equals (ear #) x (avg. row #) x (avg. kernel #) divided by 90.

Step 5. Repeat the procedure for at least four additional sites across the field.

Example: You are evaluating a field with 30-inch rows. You counted 24 ears (per 17' 5" = row section). Sampling every fifth ear resulted in an average row number of 16 and an average number of kernels per row of 30. The estimated yield for that site in the field would be (24 x 16 x 30) divided by 90, which equals 128 bu/acre.

The **Ear Weight Method** can only be used after the grain is physiologically mature (black layer), which occurs at about 30 to 35 percent grain moisture. Since this method is based on actual ear weight, it should be somewhat more accurate than the yield component method above. However, there still is a "fudge factor" in the formula to account for average shell-out percentage.

Sample several sites in the field. At each site, measure off a length of row equal to 1/1,000 acre. Count the number of harvestable ears in the 1/1,000 acre.

Weigh every fifth ear and calculate the average ear weight (pounds) for the site. Hand shell the same ears, mix the grain well, and determine an average percent grain moisture with a portable moisture tester.

Calculate estimated grain yield as follows:

Step A. Multiply ear number by average ear weight.

Step B. Multiply average grain moisture by 1.411.

Step C. Add 46.2 to the result from step B.

Step D. Divide the result from step A by the result from step C.

Step E. Multiply the result from step D by 1,000.

Example: You are evaluating a field with 30-inch rows. You counted 24 ears (per 17 ft. 5 in. section). Sampling every fifth ear resulted in an average ear weight of half a pound. The average grain moisture was 30 percent. Estimated yield would be [(24 x 0.5) / ((1.411 x 30) + 46.2)] x 1,000, which equals 135 bu/acre.

Because it can be used at a relatively early stage of kernel development, the Yield Component Method may be of greater assistance to farmers trying to make a decision about whether to harvest their corn for grain or silage. Keep in mind that kernel stages vary widely this year depending on when corn was planted and the variation in heat unit accumulation in different parts of the state. Keep in mind that kernel abortion can occur as late as the R3 milk to some extent early dough, R4 stage so yield estimates made in corn fields experiencing drought stress before this stage may overestimate corn yields. Since drought stress conditions in some fields may also result in poorly filled small ears, there may be mechanical difficulties with sheller or picker efficiency that need to be considered. When droughts occur, it's often cheaper to buy corn for grain than to buy hay for roughage (because of likely forage deficits). Therefore, there may be greater benefit in harvesting fields with marginal corn grain yield potential for silage. **IPM**

1 – Southeast

Ned Birkey

Weather

The weather has been great as we have had rain and some warmer temperatures to try to catch up on some growing degree units. We will need a warm September and early October to allow full season soybeans to reach their yield potential.

Crop report

Alfalfa and hay crops have generally had good yields this growing season. Potato leafhoppers and now grasshoppers have been into fields causing damage. Some newly seeded fields look good.

Corn is denting for most maturities. I have seen very little corn silage put up so far as plants have remained very green, though that should change very soon. Although corn yields look promising, the tip ends of many ears do not have kernels, either pollination did not occur or kernel aborted.

Soybeans are generally at the R6 to R7 stage with very few early Group II fields that may be combined late next

week. Earlier maturing varieties seem to be losing leaves daily and even Group III soybean leaves are starting to turn yellow. The later maturing soybeans can use all the time that Mother Nature will provide, and this time will add to the yield. Sudden Death Syndrome, Sclerotinia white mold and soybean cyst nematodes can be found now in some fields. All three will affect yields in those respective fields.

Wheat planting will begin around October 1 as the Hessian fly-free date is September 18 for Washtenaw County and September 21 for Monroe County. MSU Extension recommends that farmers begin seeding winter wheat seven to 10 days after the Hessian fly-free date. About 60 percent of the yield potential for wheat is set once the drill leaves the field.

Miscellaneous

The last fall field day will be on Wednesday, September 23 at the MSU Corn and Soybean Variety Trial location in Lenawee County. The field day will be from 2:00 PM to 5:00 PM and the location is on Hoagland Road, north of Holloway Road, south of Britton, Michigan. Lunch will be served on site and there will be a corn yield guessing contest with the winners announced at the February 18 MSU IPM meeting at Cabela's. **IPM**

2 – Southwest

Bruce MacKellar

Weather

Growing seasons are all unique and the 2009 growing season was no exception. What started out as an extremely wet and cool spring, ended up as a very dry and cool summer. Planting was delayed in many areas with large wet areas simply not being planted. This was especially true in southern Berrien County where the fields remained unworkable until June. We had an extended period of drought, roughly from June 20 until August 8 where widespread portions of eastern Van Buren and Kalamazoo counties received less than half an inch of precipitation during the most critical part of the growing season. And finally, we had some of the best growing conditions of the season in late August through early September.

While this late season improvement in conditions have been welcomed by growers, it is hard to make up for earlier challenges this season. We are at least a week to 10 days behind where we would normally be in terms of crop development, partially due to later planting dates, partially due to cooler than normal temperatures, and partially due to drought stress. The good news is that the crops are growing pretty well. But warm September daytime temperatures do not seem to be the same as warm July and August days. This year's crops remain behind schedule. An early frost would still have a significant impact on many corn and soybean acres in southwest Michigan.

Crop report

The **commercial crop** was significantly impacted by drought, even beyond the devastated areas of Kalamazoo and eastern Van Buren counties. Many fields had firing of the lower leaf canopy. I would anticipate that this could lead to lower test weights for corn in many locations in the southwest corner of the state. Western bean cutworms are much more evident in many fields in the area this year. The counts in Van Buren County were in the 50 to 150 moths range (per season) with less in the southeastern corner of the county. In looking at fields for disaster declaration potential in Kalamazoo County, I would estimate that we would see a two to five percent western bean cutworm infestation rate on average, but it is impossible to know how many of those fields were protected by Herculex or sprayed for the pest. Western bean cutworm seems to be increasing in population in our area, and I would anticipate that it should be on producers' radar screen for the next growing season and beyond. We also saw damage from spider mites on corn in a few fields. As we approach harvest, it will probably be important to evaluate your corn hybrids stalk strength, particularly if you want to reduce moisture content in the field as much as possible.

Late season **soybean** aphid populations were the big story in the southwest. We did not see significant numbers of the pest until fairly late in the season. The conventional logic is not to spray aphids beyond the R5 window, where the threshold is really around 1,000 aphids per plant. Usually, there are more aphids preparing to return to their overwinter host, the common buckthorn plant, and a higher percentage of the population in the fields are anticipated to be males. Also we get the benefit of high plant canopy wetness from morning dews that encourage the development of pathogenic fungi outbreaks, which can crash populations of aphids and spider mites in a hurry. And finally, the predator populations have reached the point where they can begin to have an impact on the populations of the pest. The challenge is that the crops were very late this year and aphid populations remained higher than anticipated longer this season. The overall drier conditions over late August and early September seemed to help suppress the effect of pathogenic fungi. What the impact will be on aphids returning to the overwintering host and next year's populations remain to be seen.

Spider mites were a significant problem in sporadic areas across the region. Since the pest is very small, it needs to be detected by the stippling (yellowing to early bronzing) damage. The time to treat for the pest is fairly early where there are only a few pockets of damage showing in the field. We also have seen an increase in the incidence of Sudden Death Syndrome (SDS) in pockets of fields. Only a few fields had enough widespread damage from the disease to have significant yield impacts. But a few fields did. If you see signs of the disease (bright, yellow leaves, with green veins and dark areas between the veins), it can be a warning sign of a festering problem. Check your fields for soybean cyst nematode, which is almost always a co-factor in the development of Sudden Death Syndrome. We also saw issues with white mold in irrigated soybeans. Increasing air flow by limiting populations, planting in 30-inch rows, and avoiding excessive irrigation during early flowering can help. Watch for white mold development when planting in fields that have a dry or snap bean history.

Final thoughts

We will most likely be facing challenges during the harvest season this fall. We have both corn and soybeans that are significantly behind in maturity and will probably remain in the field longer than normal this year. Corn moisture levels will remain higher, which means more drying. There will probably be more green stems in soybeans during the harvest this year. Both of these situations can lead slowdowns in the harvest process and potentially plugged equipment. Take time to think about safety for yourself, your family and your employees when working around harvest equipment, particularly under these circumstances. Injuries can turn a challenge into a tragedy, so take the time to be safe on the farm and on the roadways. **IPM**

Weather news

Jeff Andresen, Agricultural Meteorology and Geography

After an extended period of mostly sunny, dry weather across the state and region, forecast guidance is now suggesting some major upper air changes during the upcoming week. The upper air ridging pattern across the region that has led to the abnormally dry conditions (in the State Climatology Office, we've referred to it as our Michigan version of "California weather") will give way to a troughing pattern by early next week, resulting in cooler and wetter weather. In the shorter term, a weak cool front will move through the state Friday, September 18, possibly setting off a few widely scattered showers or sprinkles. Most areas will remain dry and experience only a temporary increase in cloudiness and a wind shift to the north by late in the day. High pressure behind the front will move into the state by Friday evening, bringing clearing cool, dry and fall-like conditions. Some scattered light frost will be possible overnight Friday into Saturday morning, mainly in interior sections of the Upper and northern Lower Peninsulas. The high pressure should lead to fair and dry conditions Saturday and Sunday. By Monday, the transition to the upper air pattern mentioned above should be underway with the threat of showers statewide.

An unsettled weather pattern is likely through the middle of next week with a chance for rainfall on a daily basis. High temperatures the next few days will generally range from the low or mid-50's far north to the mid- or upper 70's far south. Lows will range from the 40's north to 50's south except for Saturday morning, when 30's are likely across northern and central sections of the state. Medium range forecast guidance is primarily based on the upper air pattern change noted above (ridging across western North America, troughing across central and eastern sections), although latest versions suggest the strength of the troughing may be less than in previous model. This has very important implications for our forecast, as the new trough will bring the chance for frost and freezing temperatures to at least parts of the region during the middle to latter part of next week. (Earlier versions of this guidance more strongly suggested the likelihood of widespread frost across Michigan and the Great Lakes region.) The other hint from the latest guidance is that this upper air change may be somewhat temporary with the troughing feature moving out after a few days resulting in a gradual moderation of temperatures.

As it stands right now, the NOAA Climate Prediction Center **6-10 day** and **8-14 day outlooks** for September 22-26 and September 24-30, both call for below normal mean temperatures state- and region-wide. Based on the most recent forecast guidance, I am personally hoping for and expecting a bit more moderate conditions than this scenario. For precipitation totals, the outlooks call for above normal totals statewide during the 6-10 day time frame with near normal totals during the 8-14 day period. **IPM**

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

STATION OR DISTRICT	BASE 42 BE DEGREE-DAYS AS OF 09/16 2008	2009	BY 09/21	BY 09/26	BASE 50 BE DEGREE-DAYS AS OF 09/16 2008	2009	BY 09/21	BY 09/26
WEST UP NORMS**		2808	2876	2928		1765	1803	1828
MARQUETTE	2561	2447	2501	2559	1538	1435	1463	1486
STEPHENSON	2953	2814	2876	2943	1869	1738	1771	1800
EAST UP NORMS		2569	2637	2690		1543	1577	1600
CHATHAM	2407	2407	2462	2522	1463	1407	1433	1456
SSMARIE	2669	2536	2594	2658	1594	1474	1502	1525
N.W. LP NORMS		3102	3186	3252		2004	2053	2089
LAKECITY	3030	2813	2873	2951	1921	1709	1741	1777
PELLSTON	2902	2579	2634	2705	1820	1558	1587	1620
N.E. LP NORMS		3034	3114	3177		1937	1984	2016
ALPENA	3062	2823	2883	2959	1945	1729	1761	1797
HTNLAKE	3124	2841	2901	2978	1992	1724	1756	1791
OSSINEKE	3034	2784	2843	2918	1918	1689	1720	1755
ROGERCITY	3095	2813	2873	2949	1969	1701	1732	1768
W. CENT. LP NORMS		3375	3467	3540		2222	2279	2320
FREMONT	3375	3255	3326	3414	2198	2047	2086	2131
CENT. LP NORMS		3462	3553	3626		2297	2353	2394
ALMA	3510	3313	3384	3474	2332	2103	2143	2190
WHEELER	3375	3212	3280	3368	2212	2028	2066	2112
E. CENT. LP NORMS		3496	3592	3672		2328	2387	2433
AKRON	3390	3170	3241	3340	2220	1987	2029	2081
BADAXE	3426	3114	3184	3281	2251	1955	1996	2048
PIGEON	3307	3084	3153	3249	2144	1918	1959	2009
SAGINAW	3617	3433	3510	3617	2412	2199	2245	2303
SAGVALLEY	3499	3155	3226	3324	2323	1963	2004	2056
STANDISH	3166	3000	3067	3161	2045	1856	1895	1944
S.W. LP NORMS***		3810	3917	4008		2586	2655	2709
ALLENDALE	3364	3280	3348	3447	2180	2061	2100	2154
GRAPIDS	3861	3721	3798	3910	2630	2447	2494	2557
GULLLAKE	4197	3941	4023	4141	2921	2629	2679	2747
SOUTHBEND	3992	3910	3991	4109	2736	2608	2658	2725
S. CENT. LP NORMS		3726	3830	3916		2522	2590	2641
ALBION	3723	3574	3650	3756	2489	2318	2363	2422
CERESCO	3640	3488	3562	3665	2413	2237	2281	2337
COLDWATER	3705	3707	3785	3895	2478	2436	2484	2545
IONIA	3495	3311	3381	3479	2304	2097	2138	2191
LANSING	3746	3560	3635	3741	2523	2293	2338	2396
OWOSSO	3511	3359	3430	3530	2325	2139	2181	2235
S.E. LP NORMS		3748	3853	3943		2534	2602	2656
FLINT	3779	3450	3522	3625	2555	2206	2248	2305
HELL	3654	3551	3625	3731	2447	2296	2340	2399
LAPEER	3551	3327	3396	3496	2347	2118	2159	2213
PETERSBRG	3689	3544	3618	3724	2472	2302	2346	2405
ROMEO	3627	3448	3520	3623	2417	2214	2257	2313
TIPTON	3742	3563	3637	3744	2504	2304	2348	2407
TOLEDO	4069	3958	4040	4159	2813	2642	2693	2760

* 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.
Report generated at 08:47, 09/17/09

Michigan State University Cooperative Agricultural Weather Service
Cumulative Precipitation Summary For 09/16/2009*

STATION	DIST	PRECIPITATION TOTALS SINCE 09/10/2009 (last week) Actual	09/03/2009 (last 2 weeks) Actual	Dev. Norm.	08/20/2009 (last 4 weeks) Actual	Dev. Norm.	04/01/09 (since Apr.1) Actual	Dev. Norm.
MARQUETTE	WU	0.00	0.00	-1.71	2.23	-1.41	12.80	-5.56
STEPHENSON	WU	0.00	0.00	-1.71	1.91	-1.73	13.16	-5.20
CHATHAM	EU	0.00	0.00	-1.62	2.32	-0.99	14.87	-2.33
SSMARIE	EU	0.00	0.06	-1.56	2.01	-1.30	13.21	-3.99
LAKECITY	NWL	0.00	0.00	-1.56	2.16	-0.93	17.69	1.52
PELLSTON	NWL	0.00	0.00	-1.56	1.67	-1.42	12.39	-3.78
ALPENA	NEL	0.00	0.00	-1.50	2.49	-0.57	19.02	2.84
HTNLAKE	NEL	0.00	0.00	-1.50	1.09	-1.97	16.27	0.09
OSSINEKE	NEL	0.00	0.00	-1.50	1.95	-1.11	16.84	0.66
ROGERCITY	NEL	0.00	0.00	-1.50	1.21	-1.85	20.75	4.57
FREMONT	WCL	0.00	0.00	-1.38	1.21	-1.91	14.94	-1.51
LUDINGTON	WCL	0.00	0.00	-1.38	1.87	-1.25	15.09	-1.36
ALMA	CL	0.00	0.00	-1.20	1.07	-1.91	19.08	1.86
WHEELER	CL	0.02	0.02	-1.18	1.16	-1.82	16.99	-0.23
AKRON	ECL	0.00	0.00	-1.04	0.80	-1.60	16.74	1.42
BADAXE	ECL	0.00	0.00	-1.04	0.58	-1.82	16.38	1.06
PIGEON	ECL	0.00	0.00	-1.04	0.55	-1.85	16.65	1.33
SAGINAW	ECL	0.00	0.01	-1.03	0.49	-1.91	15.92	0.60
SAGVALLEY	ECL	0.00	0.00	-1.04	0.80	-1.60	16.74	1.42
STANDISH	ECL	0.00	0.00	-1.04	1.17	-1.23	15.23	-0.09
ALLENDALE	SWL	0.00	0.00	-1.22	1.82	-0.90	18.95	1.30
GRAPIDS	SWL	0.00	0.04	-1.18	1.95	-0.77	21.31	3.66
GULLLAKE	SWL	0.02	0.09	-1.13	3.44	0.72	21.56	3.91
SOUTHBEND	SWL	0.00	0.07	-1.15	3.71	0.99	21.73	4.08
ALBION	SCL	0.00	0.35	-0.65	1.99	-0.62	19.16	1.69
BATH	SCL	0.01	0.02	-0.98	1.57	-1.04	25.37	7.90
CERESCO	SCL	0.00	0.17	-0.83	2.04	-0.57	18.34	0.87
COLDWATER	SCL	0.00	0.14	-0.86	1.63	-0.98	17.80	0.33
IONIA	SCL	0.00	0.02	-0.98	1.37	-1.24	18.03	0.56
LANSING	SCL	0.00	0.00	-1.00	2.21	-0.40	24.28	6.81
OWOSSO	SCL	0.00	0.05	-0.95	1.16	-1.45	22.09	4.62
FLINT	SEL	0.02	0.02	-0.93	0.85	-1.52	22.16	5.39
HELL	SEL	0.00	1.77	0.82	3.98	1.61	21.92	5.15
LAPEER	SEL	0.00	0.00	-0.95	0.91	-1.46	17.32	0.55
PETERSBRG	SEL	0.00	0.69	-0.26	2.80	0.43	15.80	-0.97
ROMEO	SEL	0.00	1.07	0.12	2.20	-0.17	18.03	1.26
TIPTON	SEL	0.00	1.00	0.05	3.12	0.75	18.11	1.34
TOLEDO	SEL	0.00	1.95	1.00	2.67	0.30	18.43	1.66

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Crop Advisory Team Alerts
Integrated Pest Management Program
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East Lansing, Michigan 48824 -1302

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