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Using Climatological Information for Corn Hybrid Selection in Michigan

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Since production of corn hybrids became a major agricultural enterprise in Michigan, there has been a push to plant "full-season" hybrids. If planted early, a full-season hybrid can take advantage of more of the growing season and thus produce higher yields. Recent experience with cool, wet springs and cool growing seasons (e.g., 1992) brings the advisability of planting full-season hybrids under question. Even if higher yields can be obtained, higher kernel moisture may cause unacceptable harvesting delays and/or excessive drying costs. The purposes of this publication are to:

- Define full-, medium- and short-season hybrids.
- Explain growing degree-days and how they relate to corn hybrid maturity.
- Present information on growing degree-day accumulation and dates of fall frost for various Michigan locations.

Growing degree-days (GDD) and frost dates can be used to help select corn hybrids for a particular location. Planting hybrids that are "out of synch" with climatological normals has certain consequences, which we will point out.

Which corn hybrid to plant is one of the most important decisions made each year in a corn management system. This bulletin will assist decision making based on the normal or average climate for your location. Corn hybrids may not differ much in the cost of seed, but selecting a hybrid with the proper maturity for your location can return huge dividends at harvest.

What is a full-season hybrid?

In general, a full-season hybrid is one that uses (or requires) the entire growing season available at a particular location and reaches physiological maturity before the first killing frost in the fall. Which varieties are full-season hybrids for a particular location will depend on air temperature patterns throughout the growing season. Variations in what is considered a full-season hybrid may also occur as a result of any factor that influences soil temperature early in the season, such as topography, residue cover, tillage system and drainage. For example, if a 110-day relative maturity (RM) hybrid is considered full-season for a particular location under a fall moldboard plowed system, a 100- or 105-day RM hybrid may be considered full-season on the same field under a no-till system in which soil warming and spring corn planting are delayed because of heavy residue cover.

It is important to understand that the "days" designation used to identify a maturity group of hybrids may not reflect the actual number of days that it takes for a specific hybrid to reach maturity. This classification is used to indicate when hybrids mature in relation to other hybrids of known maturity. Mid-, short- and ultra-short-season hybrids could be considered those that are approximately 5, 15 and 20 days RM, respectively, earlier than a full-season hybrid for a particular location. For example, a 95-day RM hybrid does not necessarily mature in 95 days. However, under similar climatic conditions and cultural practices (planting date, soil type, tillage, fertility, etc.), a 95-day RM hybrid should

Table 1. Approximate relative maturities for full- to ultra-short-season hybrids for four regions in Michigan.

Hybrid Maturity	Michigan Location: Southern LP*	Central LP	Northern LP	UP
	relative maturity (days)			
Full-season	100-110	100-105	90-100	80-90
Mid-season	95-105	95-100	85-95	75-85
Short-season	85-95	80-95	75-85	70-75
Ultra-short-season	80-90	75-85	70-80	—

*Southern LP (Lower Peninsula) refers to the lower three tiers of counties.
Northern LP is the area parallel to Isabella County and north.
The Central LP is the remaining counties, including the Thumb.

mature approximately 10 days earlier than a 105-day RM hybrid.

Table 1 gives approximate relative maturities for full- to ultra-short-season hybrids for four regions in Michigan. Adjustments would need to be made to take into consideration local climatic conditions (e.g., proximity to Great Lakes, topography, etc.) and cultural practices. These estimates are based on a planting date of early May.

Not all companies use the same standards for determining relative maturities of their hybrids. Though most seed companies categorize their corn hybrids according to relative maturity (days), another way to categorize hybrids is by growing degree-days. Your seed company representative can clarify that company's practice. Following a discussion of growing degree-days, we will present information about the relationship between these two methods of categorizing corn hybrid maturity.

What are growing degree-days?

The growth rate of corn depends largely on the relative amount of heat in the environment in which it grows. Knowing this, we can easily monitor the development of a corn crop as well as select hybrids that are climatologically suitable for your area by learning how to calculate and use growing degree-day statistics. A growing degree-day unit (GDD) is a representative index of accumulated heat, normally derived from temperatures at a given location. GDD are calculated daily and summed for all or a portion of the growing season.

To calculate GDD for corn on a given day, take the day's minimum temperature and, if it is lower than 50 degrees F, set it up to 50 degrees F. If the maximum temperature is higher than 86 degrees F, set it down to 86 degrees F. We do this because corn growth doesn't begin until temperatures warm to about 50 degrees F and growth slows significantly at 86 degrees F and higher. Next, calculate the average of the day by dividing the sum of the maximum and the minimum by 2. Finally, subtract the base temperature of 50 from this average to get your GDD for the day. In summary;

GDD = ([maximum temperature 86 + minimum temperature 50] /2) - 50.

Example: Your maximum temperature is 76, your minimum is 46. Set your minimum up to 50. Then:

GDD = ([76 + 50] /2) - 50.
= 63 - 50
= 13 GDD

Note:

Endless methods and reference temperatures may be used for calculating "degree-days". Be very careful when using data from different sources that the methods are consistent — direct comparisons with other methods will likely not be possible. Most growers, businesses and scientists involved in corn production use the above methodology. Also, applying the numbers here to other crops that do not share the 50 degree F base temperature would be inappropriate.

Seasonal growing degree-day accumulation in Michigan

The growing season in a climate such as Michigan's is normally defined as the number of days between the last occurrence of 32 degrees F in the spring and the first occurrence of 32 degrees F in the fall. For corn, this is somewhat misleading, because the date of planting, when GDD accumulation should begin, varies from year to year depending on field conditions, and because the corn crop may not be entirely killed by the first freezing temperatures of the fall. GDD accumulations are, therefore, presented for a range of possible planting dates in the spring through the normal first occurrence of 30 degrees F in the fall. For this report, 20 representative stations were chosen from corn-growing areas of Michigan for calculation of GDD statistics for the period 1961-1990 (see Figure 1). The 1961-1990 period was chosen to be consistent with internationally established climatic practices. Using such statistics is probably the only realistic way to plan for future weather trends because forecasting weather-dependent events and processes (such as GDD accumulations) more than several weeks in advance is nearly impossible in our region of the world.

First killing freeze statistics

The 50th percentile or normal dates of first fall killing freeze (defined above as the first occurrence of 30 degrees F or lower) are given in Figure 2. Spatial patterns in these dates are fairly evident: the earliest dates are generally found at interior locations away from the moderating influence of the Great Lakes, especially in northern sections of lower Michigan and western upper Michigan.

Additional first killing freeze statistics are listed in Table 2. In this and subsequent tables, seven numbers representing different percentages of first freeze statistics (Tables 3-7 deal with seasonal GDD accumulations) are given for each station. The numbers in the tables describe the range and frequency with which events have occurred in the past.

Example:

In Table 2, the 30th percentile first killing freeze at Allegan is given as October 4. This means that for the period 1961 - 1990, the first killing freeze occurred on or before October 4 in 30 percent of the years.

Given the normal date of the first killing freeze in the fall, we were able to calculate accumulated GDD on a seasonal basis. Because planting dates differ markedly from year to year, sets of statistics were developed at each location for five hypothetical planting dates: April 20, May 1, May 10, May 20 and June 1. Seasonal accumulation for each year ended on the date of normal first killing freeze at each location. Percentile statistics of seasonal GDD accumulation are given for the five planting dates

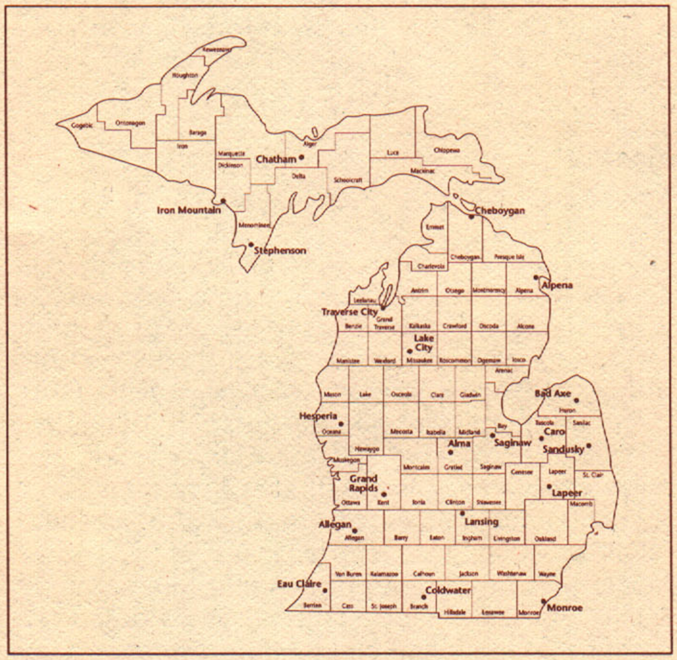

Figure 1. Stations used in derivation of climatological normals, 1961-1990.

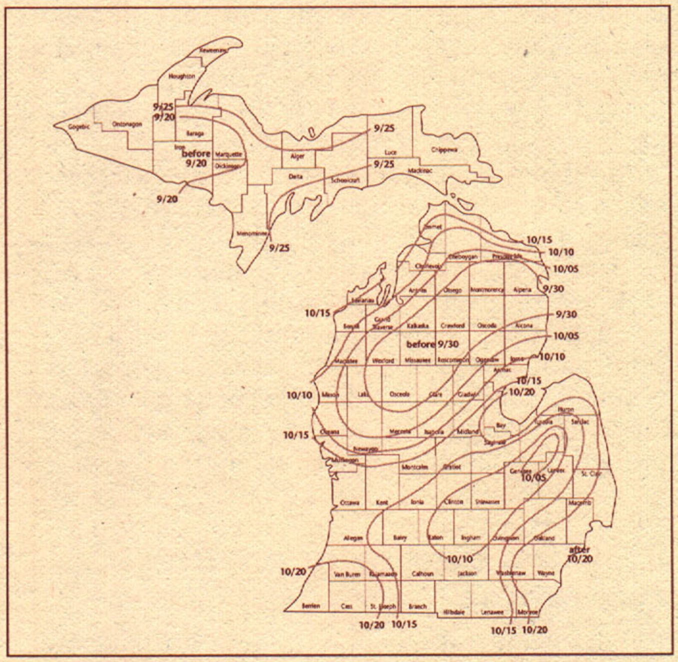

Figure 2. Normal date of first occurrence of 30 degrees F in the fall, based on 1961-1990 data.

Table 2. Statistics for date of first killing freeze (defined as minimum temperature of 30 degrees F or below) in the fall for the period 1961-1990. Dates are given in month/day format.

	Percent of seasons that the first killing freeze occurred on or before the date given in the table						
Station	5	10	30	50	70	90	95
Allegan	09/22	09/25	10/04	10/11	10/18	10/28	11/02
Alma	09/22	09/27	10/08	10/15	10/21	10/30	11/03
Alpena	09/05	09/10	09/20	09/27	10/02	10/09	10/12
Bad Axe	09/30	10/03	10/12	10/18	10/24	11/02	11/06
Caro	09/12	09/16	09/24	09/29	10/04	10/10	10/13
Chatham	08/29	09/04	09/16	09/24	10/01	10/11	10/15
Cheboygan	09/22	09/27	10/08	10/16	10/23	11/02	11/06
Coldwater	09/21	09/25	10/04	10/10	10/16	10/25	10/28
Eau Claire	10/06	10/11	10/21	10/27	11/02	11/09	11/13
Grand Rapids	09/24	09/27	10/09	10/16	10/22	10/31	11/04
Hesperia	09/14	09/16	09/22	09/27	10/03	10/13	10/20
Iron Mountain	08/28	09/08	09/15	09/22	09/27	10/05	10/09
Lake City	09/01	09/06	09/15	09/21	09/28	10/07	10/12
Lansing	09/19	09/24	10/02	10/08	10/14	10/23	10/27
Lapeer	09/11	09/17	09/30	10/08	10/17	10/30	11/04
Monroe	10/03	10/07	10/16	10/22	10/29	11/06	11/11
Saginaw	09/29	10/04	10/13	10/20	10/25	11/02	11/06
Sandusky	09/12	09/21	10/06	10/15	10/22	10/30	11/03
Stephenson	09/01	09/06	09/15	09/21	09/27	10/05	10/09
Traverse City	09/17	09/22	10/03	10/10	10/18	10/29	11/03

in Tables 3-7. The 50th percentile or normal seasonal GDD totals are illustrated in Figures 3-7.

Patterns for seasonal GDD accumulation are similar to those for the first killing freeze data, with statewide maxima in the southwest and southeast corners of the Lower Peninsula and minima in interior areas of northern lower Michigan and the Upper Peninsula. In the Lower Peninsula, seasonal totals drop off rapidly north of a line from Muskegon to Saginaw. Seasonal totals decrease only slightly (approximately 60 to 90 GDD) from the April 20 planting date to May 1 or May 10 but fall rapidly thereafter (approximately 140 to 290 GDD less for the June 1 planting date totals vs. May 20), following the rapid seasonal rise in temperatures during May. This underscores the importance of early planting in Michigan, as potential accumulated GDD lost by planting after early May become increasingly difficult to make up later in the season.

Reading and interpreting the tables

The percentile statistics given for the seasonal GDD tables are similar to those for the first killing freeze. The normal or 50th percentile value indicates that, climatologically, 50 percent of the seasons in the sample (in this case 15 out of a total of 30) had accumulations at or below that value, while the other 50 percent had greater values. Though the normal value is useful as a reference for future seasons, use of the other percentiles allows an estimated range of GDD seasonal totals with climatological odds.

Example:

Over the past 30 years, for a planting date of May 10 at Allegan, 2338 or more GDD accumulated in 95 percent of the seasons (see Table 5). In 5 percent of the seasons, 2764 or more accumulated. Another way of looking at this is that 90 percent (the total percentage of years included in the 5 to 95 percent range), or 9 out of 10 years, would experience GDD totals within the range of 2338 to 2764. The same holds true for other ranges, so this information allows you to objectively estimate a given range of GDD accumulation at your location with some idea of the probability of occurrence. If your location is not close to any of those given in the tables, you can still pick the values of interest at the closest two or three listed stations and carefully average among them, perhaps with greatest weight given to the closest station or the one most similar in characteristics to your location.

Table 3. Seasonal accumulations of base 50 degree F growing degree-days (calculated with the 86-50 cutoff method) based on a planting date of April 20 for the period 1961-1990.

	Percent of seasons that GDD totals exceeded the number in the table						
Station	95	90	70	50	30	10	5
Allegan	2470	2508	2605	2683	2767	2893	2955
Alma	2361	2427	2563	2658	2753	2889	2955
Alpena	1817	1833	1904	1964	2034	2149	2209
Bad Axe	2203	2254	2381	2479	2583	2737	2812
Caro	2367	2412	2505	2569	2634	2727	2771
Chatham	1725	1762	1849	1914	2000	2078	2124
Cheboygan	1826	1878	1999	2087	2177	2304	2364
Coldwater	2440	2490	2592	2658	2719	2801	2837
Eau Claire	2740	2801	2926	3007	3082	3181	3225
Grand Rapids	2450	2523	2651	2723	2785	2858	2889
Hesperia	2165	2194	2271	2335	2405	2514	2569
Iron Mountain	1884	1915	1995	2060	2130	2236	2289
Lake City	1861	1905	2005	2076	2148	2249	2296
Lansing	2397	2441	2533	2597	2661	2753	2797
Lapeer	2377	2430	2540	2617	2694	2805	2858
Monroe	2707	2799	2963	3058	3139	3239	3280
Saginaw	2334	2388	2500	2577	2655	2767	2821
Sandusky	2260	2316	2442	2534	2627	2757	2818
Stephenson	1936	1964	2035	2093	2155	2250	2296
Traverse City	2061	2118	2237	2319	2401	2520	2577

Table 4. Seasonal accumulations of base 50 degree F growing degree-days (calculated with the 86-50 cutoff method) based on a planting date of May 1 for the period 1961-1990.

	Percent of seasons that GDD totals exceeded the number in the table						
Station	95	90	70	50	30	10	5
Allegan	2395	2434	2531	2607	2686	2804	2861
Alma	2270	2346	2498	2595	2684	2800	2851
Alpena	1783	1800	1857	1912	1980	2099	2164
Bad Axe	2138	2193	2323	2422	2523	2670	2739
Caro	2335	2359	2420	2472	2534	2648	2715
Chatham	1692	1721	1799	1861	1927	2028	2078
Cheboygan	1782	1837	1962	2052	2142	2269	2328
Coldwater	2399	2438	2520	2577	2633	2715	2754
Eau Claire	2677	2731	2846	2922	2994	3090	3133
Grand Rapids	2375	2452	2581	2652	2711	2780	2808
Hesperia	2075	2120	2213	2278	2343	2436	2481
Iron Mountain	1815	1849	1934	2001	2072	2179	2231
Lake City	1794	1840	1944	2017	2090	2191	2238
Lansing	2327	2371	2461	2524	2587	2678	2721
Lapeer	2347	2377	2452	2515	2592	2732	2814
Monroe	2663	2745	2893	2978	3051	3139	3176
Saginaw	2265	2315	2429	2512	2593	2708	2761
Sandusky	2208	2259	2377	2465	2556	2687	2749
Stephenson	1855	1890	1973	2036	2101	2195	2240
Traverse City	2015	2062	2174	2258	2344	2469	2527

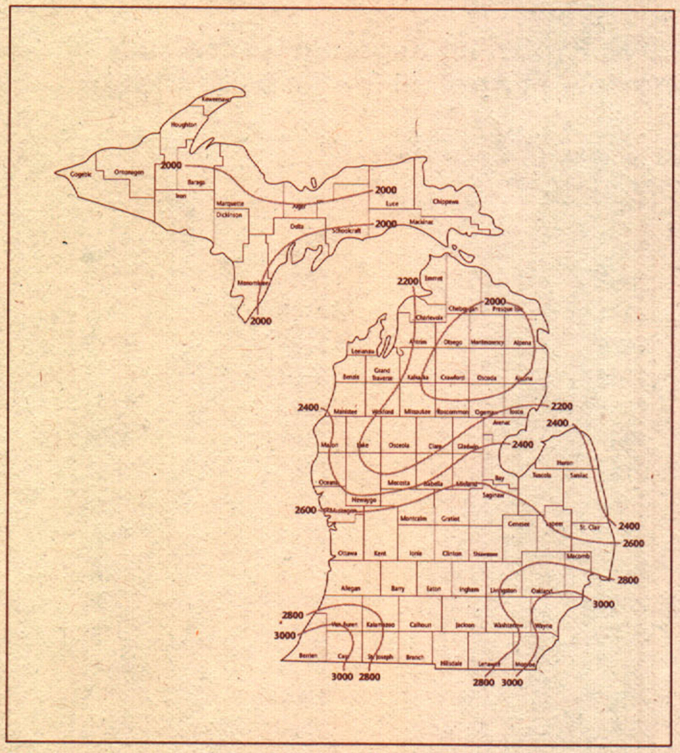

Figure 3. Normal number of base 50 degree F growing degree-days accumulated between a planting date of April 20 and normal first killing frost (30 degrees F) in the fall, based on 1961-1990 data.

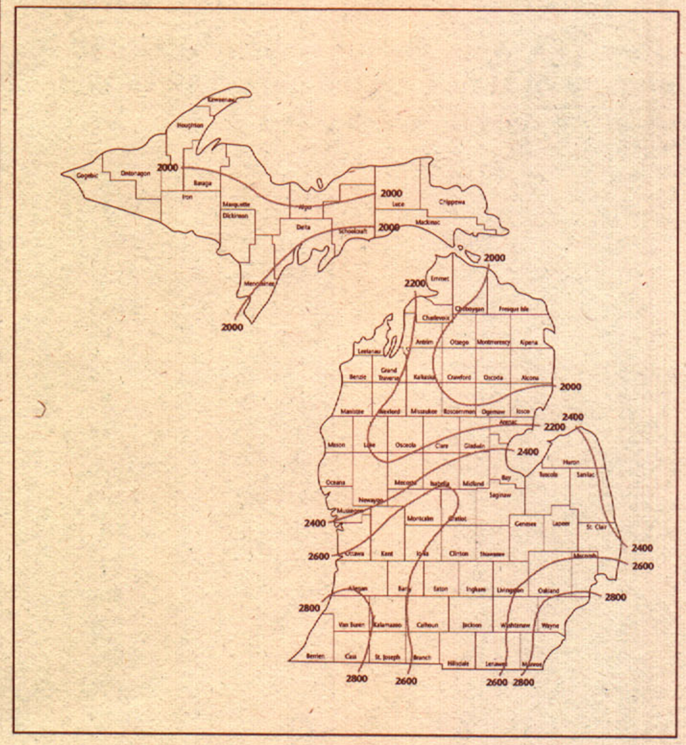

Figure 4. Normal number of base 50 degree F growing degree-days accumulated between a planting date of May 10 and normal first killing frost (30 degrees F) in the fall, based on 1961-1990 data.

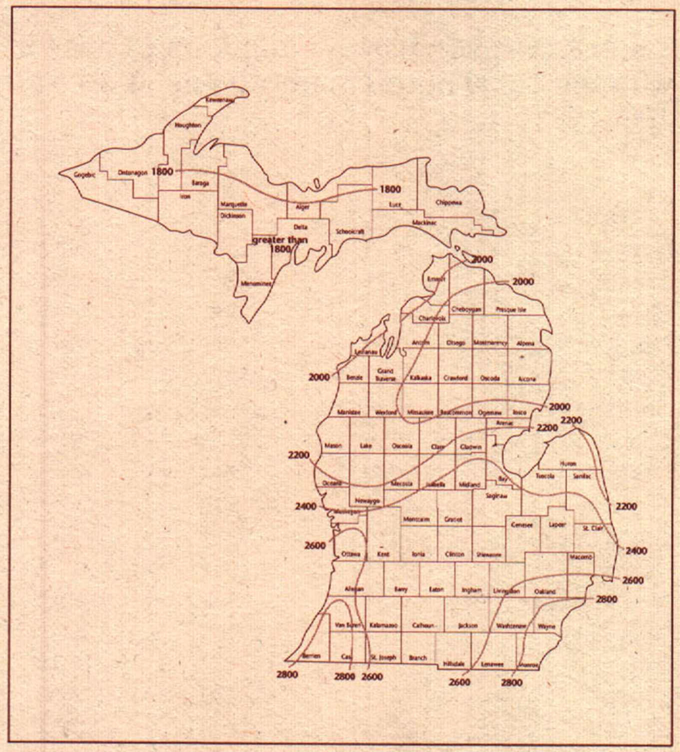

Figure 5. Normal number of base 50 degree F growing degree-days accumulated between a planting date of May 20 and normal first killing frost (30 degrees F) in the fall, based on 1961-1990 data.

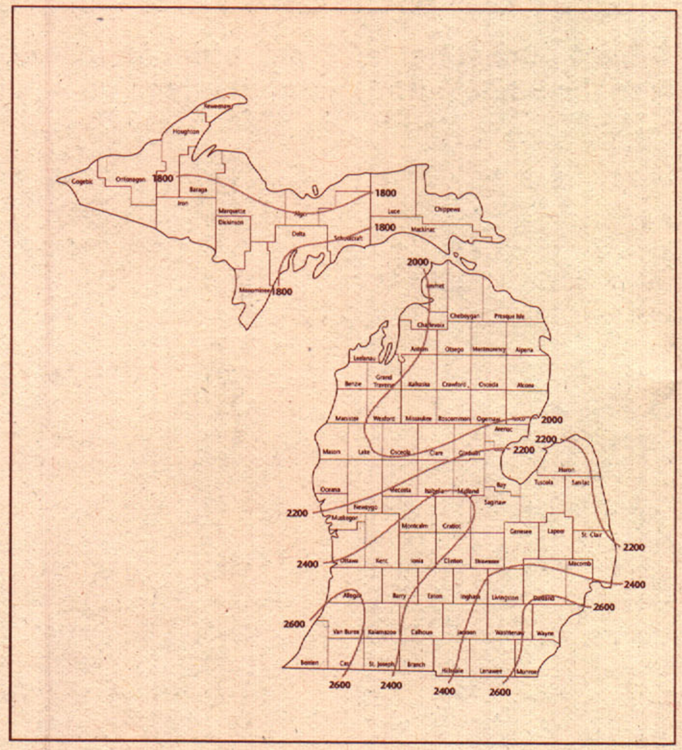

Figure 6. Normal number of base 50 degree F growing degree-days accumulated between a planting date of May 30 and normal first killing frost (30 degrees F) in the fall, based on 1961-1990 data.

Table 5. Seasonal accumulations of base 50 degree F growing degree-days (calculated with the 86-50 cutoff method) based on a planting date of May 10 for the period 1961-1990.

	Percent of seasons that GDD totals exceeded the number in the table						
Station	95	90	70	50	30	10	5
Allegan	2338	2371	2455	2524	2598	2710	2764
Alma	2198	2274	2424	2519	2606	2718	2767
Alpena	1731	1756	1816	1867	1928	2041	2108
Bad Axe	2081	2137	2266	2361	2457	2593	2658
Caro	2268	2285	2339	2391	2454	2563	2621
Chatham	1635	1671	1756	1819	1884	1978	2022
Cheboygan	1741	1796	1920	2010	2099	2223	2281
Coldwater	2320	2357	2441	2500	2558	2637	2674
Eau Claire	2610	2659	2762	2833	2904	3007	3056
Grand Rapids	2315	2383	2504	2572	2630	2700	2729
Hesperia	2038	2065	2137	2197	2264	2368	2420
Iron Mountain	1748	1787	1880	1948	2017	2115	2161
Lake City	1733	1787	1895	1965	2030	2117	2155
Lansing	2274	2307	2385	2445	2508	2599	2643
Lapeer	2279	2308	2378	2439	2512	2645	2724
Monroe	2597	2672	2812	2895	2967	3056	3094
Saginaw	2194	2247	2365	2448	2529	2641	2692
Sandusky	2148	2197	2314	2399	2486	2609	2667
Stephenson	1787	1827	1915	1978	2041	2128	2169
Traverse City	1951	2008	2125	2207	2289	2406	2463

Table 6. Seasonal accumulations of base 50 degree F growing degree-days (calculated with the 86-50 cutoff method) based on a planting date of May 20 for the period 1961-1990.

	Percent of seasons that GDD totals exceeded the number in the table						
Station	95	90	70	50	30	10	5
Allegan	2228	2271	2362	2425	2488	2579	2622
Alma	2098	2174	2322	2414	2498	2605	2652
Alpena	1609	1654	1746	1811	1875	1967	2012
Bad Axe	1993	2049	2177	2269	2362	2492	2553
Caro	2160	2182	2236	2283	2338	2440	2500
Chatham	1540	1581	1677	1745	1814	1911	1957
Cheboygan	1672	1728	1853	1944	2036	2167	2229
Coldwater	2223	2259	2340	2396	2451	2528	2563
Eau Claire	2504	2551	2650	2718	2786	2884	2932
Grand Rapids	2226	2285	2397	2463	2522	2594	2625
Hesperia	1918	1960	2049	2110	2172	2261	2303
Iron Mountain	1649	1695	1792	1859	1926	2022	2068
Lake City	1645	1696	1803	1875	1943	2034	2075
Lansing	2166	2203	2287	2347	2408	2494	2534
Lapeer	2123	2175	2283	2357	2432	2540	2592
Monroe	2502	2574	2704	2781	2848	2931	2966
Saginaw	2078	2139	2268	2355	2439	2552	2603
Sandusky	2051	2103	2221	2306	2390	2508	2563
Stephenson	1691	1731	1821	1886	1949	2037	2078
Traverse City	1861	1918	2037	2120	2203	2322	2379

Table 7. Seasonal accumulations of base 50 degree F growing degree-days (calculated with the 86-50 cutoff method) based on a planting date of June 1 for the period 1961-1990.

	Percent of seasons that GDD totals exceeded the number in the table						
Station	95	90	70	50	30	10	5
Allegan	2085	2116	2196	2260	2330	2435	2487
Alma	1953	2021	2162	2255	2343	2460	2511
Alpena	1515	1545	1623	1685	1752	1854	1904
Bad Axe	1869	1919	2037	2127	2218	2350	2413
Caro	1981	2011	2084	2139	2195	2278	2317
Chatham	1422	1464	1560	1628	1696	1791	1836
Cheboygan	1567	1618	1742	1836	1932	2071	2138
Coldwater	2068	2106	2186	2241	2297	2377	2415
Eau Claire	2335	2374	2471	2546	2624	2738	2793
Grand Rapids	2076	2127	2233	2303	2368	2456	2494
Hesperia	1781	1817	1901	1964	2028	2120	2164
Iron Mountain	1522	1567	1660	1725	1790	1883	1928
Lake City	1526	1573	1672	1740	1808	1906	1954
Lansing	2018	2056	2142	2201	2259	2338	2375
Lapeer	1965	2017	2126	2202	2277	2386	2438
Monroe	2353	2418	2541	2616	2682	2766	2801
Saginaw	1924	1988	2123	2214	2301	2417	2469
Sandusky	1908	1960	2078	2164	2250	2371	2428
Stephenson	1568	1607	1692	1752	1810	1891	1927
Traverse City	1746	1800	1912	1990	2068	2180	2234

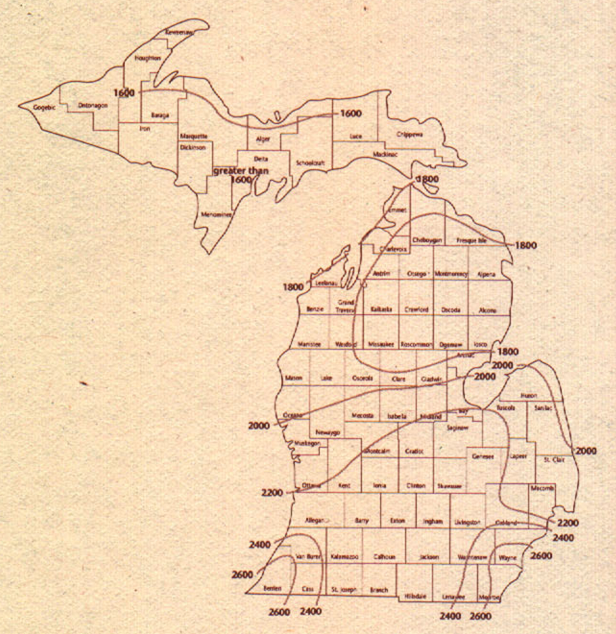

Figure 7. Normal number of base 50 degree F growing degree-days accumulated between a planting date of June 1 and normal first killing frost (30 degrees F) in the fall, based on 1961-1990 data.

A word of caution

Because of the wide variety of soils and topographical differences and the influence of large lakes, microclimate may play a significant role in determining seasonal GDD totals at your location. For example, if your crop lies in a low-lying area prone to cool air drainage or lies on muck soil, or if the closest reference station to you is near the lake while you are located farther inland, you probably need to consider the totals given here as too high, because nights at your location may be cooler and the first killing freeze may come earlier in the fall than at the reference location. The reverse would be true of locations tending to be warmer than the reference locations given in the tables.

Finally (and maybe most importantly), because we are dealing with statistics and because climate is not static over long periods of time, all values listed in this bulletin (derived from 30 recent years of data) are not a forecast of GDD totals in a given season, nor are they intended to be used for the next several decades. These GDD totals are odds-based estimates derived from climate data of the past 30 years and represent what may be expected in a given season during the next decade or so.

Using GDD information to select corn hybrids

Some seed companies collect information on the required number of GDD for specific hybrids to reach specific stages of development (e.g., silking, black layer). If this information is available, you may use it to match the normal GDD accumulation for your location, given your anticipated planting date, with hybrid requirements. Normally, if a hybrid reaches physiological maturity before the first killing freeze in the fall, it will have time to dry down so it can be harvested as grain with a minimum need for artificial drying. It is also desirable for corn grown for silage to reach black layer (physiological maturity) by the time of the first killing freeze in the fall, but loss of silage dry matter or nutrient yield may not be significant even if the crop is frosted before physiological maturity. Therefore, it may be desirable to select a longer season (higher RM) hybrid for silage production than you would select for corn grain production in the same location. (For additional information on the effect of early fall freezing temperatures on corn yield, refer to Extension bulletin NCH-57, "Handling Corn Damaged by Autumn Frost.")

It is common for seed companies to provide information on relative maturities (in days), and there may be times when you would like to estimate GDD requirements from this information. One of the best sources of information is your seed company technical representative. Table 8 provides estimates of the relationship between GDD requirements and relative maturity for corn hybrids.

When to switch hybrids in relation to planting date

The information on GDD accumulations at progressive planting dates can be used as a guide when deciding to switch to a shorter season hybrid as planting date is delayed. If, for example, you had planned to plant corn by May 1 in Caro, you can expect between 2335 and 2715 GDD to accumulate prior to the first killing frost in 9 out of 10 years (Table 4). In a "normal" year, you would expect approximately 2472 GDD to be available for corn growth. According to Table 8, a hybrid with a relative maturity of 90 to 95 days should have adequate GDD to mature before the first fall frost. If planting is delayed until May 20, however, the normal GDD available decreases to 2283 (Table 6). In this case, a 95-day RM hybrid may not mature before frost and you might consider switching to an 85-day RM hybrid (Table 8). The decision to switch to shorter season corn hybrids as planting date is delayed will depend on:

- The extent of the delay.
- Your particular location.
- Availability of seed.
- Your individual assessment of the odds.
- Your desired or anticipated harvest schedule.

Remember, the tables and figures in this bulletin are long-term averages and likely will not correspond precisely to any individual year. However, they can be of great value if you are willing to manage your corn hybrid selection according to long-term average climate statistics for your location rather than according to your guess of what the next growing season is likely to offer.

Economic importance of selecting the proper hybrid maturity

The major tradeoff to consider when selecting corn hybrid maturities is yield vs. grain moisture. Full-season hybrids will normally yield more because they take advantage of the entire growing season's GDD accumulation. However, because they reach physiological maturity later than mid- or short-season hybrids, they will likely be higher in grain moisture and may require drying.

Table 8. Estimates of the relationship between relative maturities of corn hybrids and growing degree-days.

Relative maturity (days)	GDD requirements (planting to physiological maturity)
70-80	1800-2000
80-90	2000-2300
90-100	2300-2500
100-110	2500-2700
110-120	2700-2800

Table 9. Differences in yield, moisture at harvest, drying charges and revenue between full- and short-season hybrids grown in Michigan.

	Full-season hybrids†	Mid-season hybrids‡	Difference (full-short)
Yield (bu/a)	185	162	23
Moisture (%)	26.0	20.5	5.5
Gross revenue* ($/a)	370.00	324.00	46.00
Drying cost ($/a) ($.02/point moisture/bu to 15.5% moisture)	44.32	17.20	27.12
Gross revenue less drying cost ($/a)	325.68	306.80	18.88

†average of four hybrids with RM of 112 days.
‡ average of four hybrids with RM of 101 days.
* @ $2/bu.

Results from the Michigan State University corn hybrid comparison trials, 1988-1990, were used to estimate this yield-moisture tradeoff and to estimate the economic benefit or cost of planting a full-season hybrid. The years 1988-1990 were used because those were years more like the long-term normals than either 1991 or 1992.

Four hybrids tested in central lower Michigan, with an average RM of 112 days (full-season hybrids for that location), were compared with four hybrids tested in the same location but with an average RM of 101 days (considered mid-season hybrids). The full-season hybrids averaged 23 bushels per acre higher in yield and 5.5 percent higher in moisture at harvest. Even after drying costs were calculated (estimated at 2 cents/point), the full-season hybrids gave an $18.88 per acre advantage. In years that are not typical or normal, such a comparison would give different results. Planning for the average year is still the most reasonable approach, however. Given that approach, planting full-season hybrids for your location and planting date makes the most economic sense.

The drying charges of 2 cents per percentage point of moisture per wet bushel used in the comparison in Table 9 may not accurately represent your actual drying charges. It's important to consider your actual cost of drying corn when selecting the hybrid maturity range for your farm. The difference in net income per acre between the full-season and the mid-season hybrids will decrease significantly as the cost of drying increases.

Conclusion

The GDD tables and figures in this bulletin should help you decide which corn hybrids to select for your farm with respect to maturity. The hybrids that you should consider full-season will depend on a number of factors, including:

- Your location.
- Your cultural practices.
- Your planting date.
- Your soil characteristics.

Once you have determined the normal GDD accumulation for your location, you can select hybrids that fit those normals and you can adjust hybrid selection if planting is delayed.

Though few individual years will look like the 30-year normal, it still makes the most economic sense to plan for the normal year and then make adjustments as possible if and when the normal does not occur.

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