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Using the Relative Maturity Rating System for Selecting Corn Hybrid Maturity

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In recent years, delayed seeding and replanting following killing spring frosts have caused many corn growers to consider whether they are using the right maturity rating system to select the proper hybrid maturity for their area. The most common methods for rating corn hybrid maturity include:

- The "relative maturity" (RM) rating system.
- The "growing degree day" (GDD) or "heat unit" system.

Most growers are familiar with the Minnesota RM rating system which was instituted in 1939. In this rating system hybrids are tested for three years. If a seed company thinks it has a 100-day RM hybrid it enters the hybrid in the 100-day test trial. To qualify for the 100-day RM rating the new hybrid must have a kernel moisture content within 4.0% of standard check hybrids. If the new hybrid tests 26.5% moisture and the standard check hybrids test 23% moisture, it would qualify as a 100-day hybrid.

However, if the new hybrid tests 28% moisture and the standard check hybrids tests 23% then it would not qualify for the 100-day RM rating because its moisture is higher than allowed. If the new hybrid tests 4 to 6% higher in moisture than the standard hybrids, it would be tested again in the same test trial the next year to see whether it indeed was later in maturity than the 100-day rating.

On the other hand, if the new hybrid tests more than 6% higher in moisture than the standard hybrids, it would then have to be re-labeled and tested as a 105-day hybrid. Likewise, a similar change in maturity rating would occur if the moisture content of the new hybrid was lower than the standard hybrids. Again, if the new hybrid moisture content was 4 - 6% lower than the standard moisture contents the new hybrid would be tested again for the same maturity rating.

However, if the moisture content of the new hybrid is more than 6% lower than the standard hybrids, the new hybrid would have to be re-labeled as a 95-day relative maturity hybrid.

Hybrids entered in the Minnesota RM rating system are compared against standard hybrids which, because of their known characteristics, have been defined as the standard hybrid check for a defined RM group. In Minnesota, the Northern zone includes the 75-, 80-, or 85-day RM groups; the North Central zone includes the 90-day RM group; the Central zone includes the 95- or 100-day RM groups; the South Central zone includes the 105-day RM group, and the Southern zone includes the 110- or 115-day RM groups.

An important consideration when using this system is to not confuse "relative maturity" with "days to maturity." For example, Table 1 shows the 110-day RM hybrid took at least 154 days from seeding and 133 days from emergence to reach 30% moisture, depending on seeding date. More importantly, it also shows that the 95-day RM hybrid took only one day less from seeding and from emergence to also reach 30% moisture over similar seeding dates. Regardless of RM rating, it took a similar amount of time for both hybrids to mature even though there was a difference

Table 1. Calendar days from seeding and emergence to 30% ear moisture for hybrids of adapted maturity at Lamberton and Morris.

Location	Relative Maturity	Seeding Date	Calendar days to 30% moisture: From Seeding	From Emergence
Lamberton	110 - day	April 25	154	130
		May 4	146	127
		May 17	145	133
		May 31	*	*
Morris	95 - day	April 27	153	126
		May 9	144	129
		May 17	144	132
		June 1	*	*

*Hybrids did not reach 30% moisture before frost.
Source: Peterson, R.H. and D.R. Hicks. Minnesota relative maturity rating system, Fact Sheet - Agronomy No. 27 - 1973.

of 15 days in their RM ratings.

Again, the term "days to maturity" refers to the number of days from a point in time remaining until a crop attains maturity. The term "relative maturity" compares the relative difference in maturity between one or more hybrids according to an arbitrary definition.

The hybrids in Table 1 differed in their RM rating, i.e. 110-day RM versus 95-day RM. However, both hybrids had a similar number of days from seeding or from emergence to maturity regardless of seeding date. The key to this comparison is that the 110-day RM hybrid was tested in the Southern zone at Lamberton, whereas the 95-day RM hybrid was tested further north in the Central zone at Morris. Had the 95-day RM hybrid been tested at Lamberton it likely would have matured earlier than the 110-day RM hybrid, but with a lower yield and harvest moisture. In other words it would have not taken advantage of the full growing season because it would have likely matured earlier at Lamberton than at Morris.

In contrast, had the 110-day RM hybrid been tested at Morris, it would have not matured unless the first killing frost was unusually late. Just because both hybrids had a similar number of days from seeding or from emergence to maturity does not mean they would respond similarly if the 110-day RM hybrids was seeded further north and the 95-day RM hybrid was seeded further south.

The Minnesota RM rating system works well for Minnesota growers and can be used by South Dakota growers. Since South Dakota does not have such a system our growers must use trial and error to find out which Minnesota RM rated hybrids work best in their area. In addition, when purchasing seed from South Dakota, or from other states, ask whether the hybrid(s) being considered have been rated in the Minnesota system. If no, use caution when comparing maturities, because other systems may use different standard check hybrids. As a result, hybrids tested in a given seed company RM rating group may not respond like a Minnesota RM rated hybrids even though they have a similar RM rating.

Minnesota data suggests delayed seeding affects corn growth before silking more so than after silking (Table 2). As seeding is delayed, there is a large decrease in days from emergence to silking (12 days), while the time from silking to maturity increased by 5 days. This 5 day increase may or may not be important as seeding is delayed.

Again, remember that by the latest seeding the emergence to silking interval decreased by 12 days. This decrease did not carry over to the emergence to maturity interval which only decreased by 8 days. This suggests the initial 12 day decrease from emergence to silking was reduced to only 8 days as the result of the compensatory effect of the 5 day increase at silking to maturity. This 5 day increase from silking to maturity sharply contrasts with other growth intervals where delayed seeding resulted in fewer days per interval.

Table 2. Calendar days for corn developmental intervals when seeded on four dates .

Seeding Date	Growth Stage Interval				
	Seeding to Emergence	Emergence to Silking	Silking to Maturity	Seeding to Maturity	Emergence to Maturity
April 24	19	68	61	148	129
May 5	19	63	60	142	123
May 18	12	60	63	135	123
June 1	8	56	65	129	121

Seeding Date	Silking Date	Grain Filling Date
April 24	July 20	July 20 - September 19
May 5	July 26	July 26 - September 24
May 18	July 29	July 29 - September 30
June 1	August 4	August 4 - October 8
Difference: 38 Days	Difference: 15 Days	Difference: 19 Days

Source: Hicks, D.R. 1991 Corn growth & development. Crop News No. 94, August1991, University of Minnesota.

The data in Table 2 also shows what affect delayed seeding has on corn maturity itself. There was an initial difference of 38 calendar days between the early and late seeding dates (lower half of table). This initial diffference decreased to 15 days at silking (silking date) and to only 19 days at maturity (end of grain filling date).

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