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Optimum Relative Maturity for Yield and Profitability in Corn

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Summary

- To ensure genetic diversity on your farm, select corn hybrids differing for relative maturity (RM).
- Since 1929, corn hybrids to be sold in Minnesota were rated for maturity. The law was repealed in 2003 and will be retired in 2006.
- No standard RM method exists in the corn industry.
- In southern WI, as RM increases, grain yield increases 2.2 bu/A
- Optimum RM is variable and depends upon many factors including location, soil, management style, corn price, drying method and hybrid traits.
- As a check, the company RM rating of every hybrid tested in the UW hybrid evaluation program is compared against all other hybrids of the same company maturity.

Relative maturity (RM) is determined by comparing grain moisture of hybrids at harvest. Corn is mature when kernels reach maximum dry weight. Optimum RM depends upon the harvest, use and storage methods on each farm. Corn for silage is ready as early as 10 days prior to maximum kernel dry weight, while corn picked for grain is not ready until grain moisture content reaches 23 to 28%.

Little data exists for corn relative maturity recommendations in Wisconsin. Our objective is to determine the optimum relative maturity (RM) for corn at various locations in Wisconsin.

Beginning in 1995, trials were conducted at Arlington, Chippewa Falls, Fond du Lac, Hancock, Janesville, Lancaster, Marshfield, Seymour and Valders. Each trial consists of two or more hybrids for each 5-day RM increment from 80- to 115-days for a total of 14 to 16 hybrids per trial. The hybrids are top-performing hybrids selected from the UW corn evaluation program. These hybrids change every year as well as the locations of the trial. Yield, moisture and test weight were used to calculate the economics of the RM decision.

Grower return was calculated by multiplying commodity price with yield and subtracting production costs. Harvesting costs were estimated for handling ($0.02 per bushel), hauling ($0.04 per bushel), trucking ($0.11 per bushel) and storage ($0.02 per bushel month with 25% of grain shipped in March after 4 months storage and 25% of grain shipped in July after 8 months storage). For the livestock system, no trucking cost is assessed and storage was $0.01 per bushel month. Drying costs were estimated at $0.00, $0.02, $0.04 and $0.06 per point above 15.5% moisture per bushel for on-farm and commercial corn production systems.

Longer-season hybrids have greater potential for higher yields at most locations. In southern WI, as RM increases, grain yield increases 2.2 bu/A. For example, at Arlington grain yield increases to a maximum when hybrid RM is 108-days RM (Figure 1a). At most locations, a significant relationship exists between grain yield and RM. However, at Marshfield, no relationship between grain yield and RM exists over multiple years of testing (Table 1).

Table 1. Relative maturity (days RM) for maximum grain yield and optimum economic yield in Wisconsin

Location	Years tested	N	Maximum Yield	Optimum Economic*
			RM days	RM days
Arlington	1995-2007	182	108	100
Janesville	1996-1997	30	107	105
Lancaster	1996-1997	28	112	112
Fond du Lac	1996-1997	30	103	99
Hancock	1995-2005	94	105	99
Chippewa Falls	1999-2001	42	104	---
Marshfield	1999-2004	122	---	91
Seymour	1999-2007	58	104	97
Valders	1999-2006	57	112	---

* Grain price= $4.00 per bushel, Drying cost= $0.06 per point bushel

The optimum relative maturity for grower return depends upon the corn drying method (Table 2). The RM that optimizes grower return is different from the RM that optimizes grain yield when drying costs are involved. For example, at Arlington using a corn price of $4.00 per bushel and an on-farm drying method

($0.06), grower return is greatest with a corn hybrid RM of 100 day RM (Figure 2 and Table 2). At Marshfield, a 91 day hybrid optimizes grower return.

Although farmers generally get greatest yields by planting full-season hybrids early, many short-season hybrids produce yields competitive with the best full-season hybrids and are drier at harvest (Figures 1a and 1b).

Table 2. Optimum relative maturity (days RM) for four corn production systems at Arlington (1995-2007)

System:Drying Cost	Grain price ($/bu)				
($ / point bu)	$2.00	$3.00	$4.00	$5.00	$6.00
High energy costs:$0.06	95	98	100	101	102
Commercial:$0.04	97	100	102	103	104
On-Farm:$0.02	102	104	105	105	106
Livestock:$0.00	108	108	108	108	108

Farmers need to consider the economic tradeoff between yielding ability and drying costs for hybrid maturity. Full-season hybrids provide the greatest potential for maximizing yield and profitability. Plant several hybrid maturities each year to spread the harvest season and reduce the risk of losses from moisture stress at pollination time or early frost.

Traditionally, the mix of hybrid maturities grown on a farm vary according to the risk one is willing to assume (i.e. 25% of acres grown to full-season, 50% to mid-season, and 25% to short-season maturities). Other agronomists recommend mixing hybrid maturities according to the type of environment predicted. The best approach may be to select hybrid maturities based solely on the intended use and drying method in the production system.

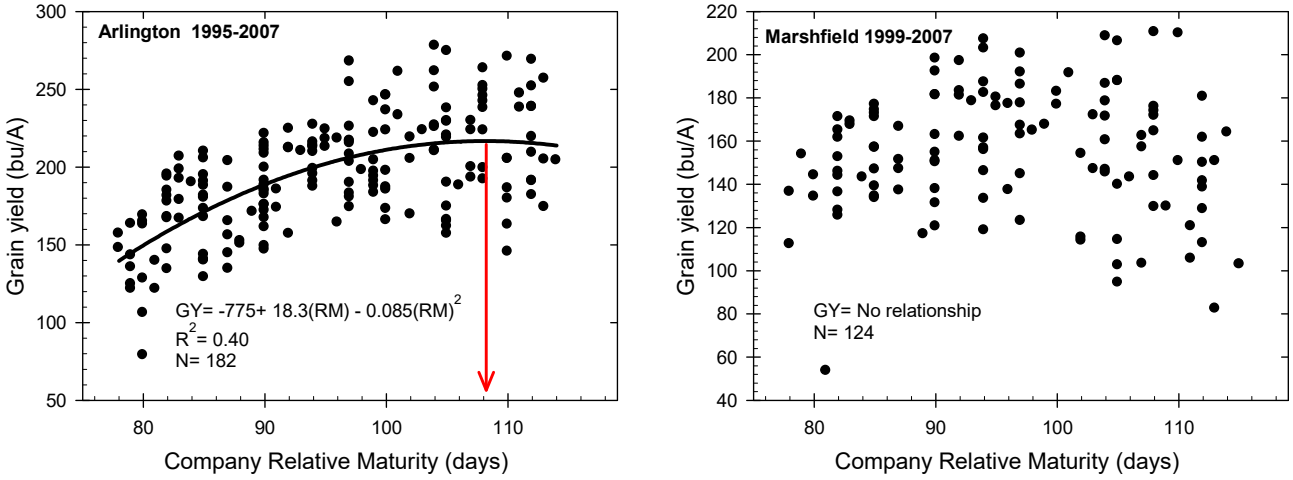

Figure 1. Influence of corn relative maturity on grain yield at Arlington and Marshfield, WI.

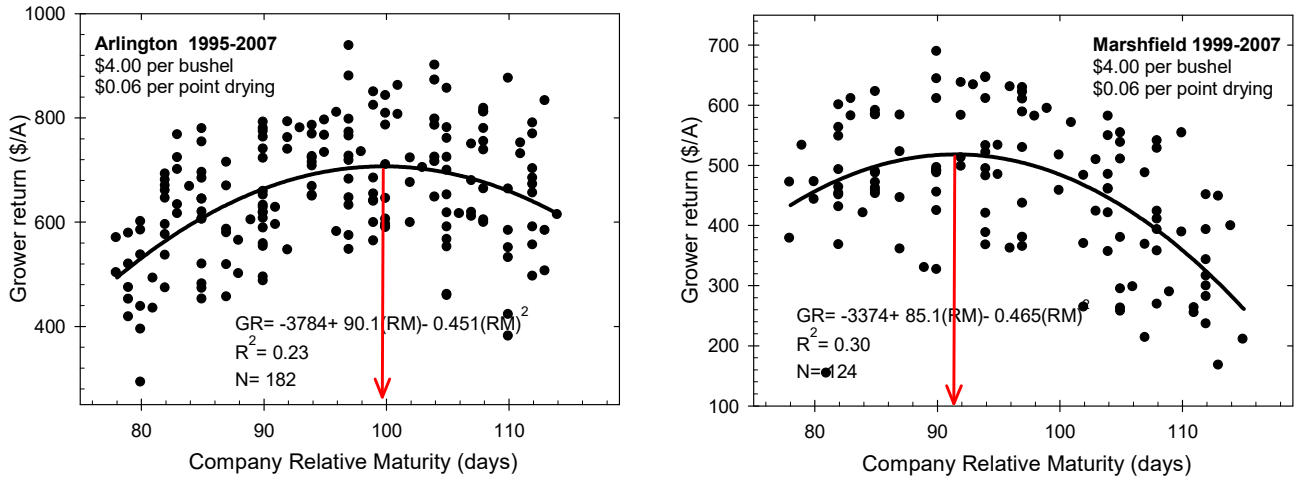

Figure 2. Influence of corn relative maturity on grower return at Arlington and Marshfield, WI.