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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 The law was repealed in 2003 and will be retired in 2006.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. At a corn price of $2.50 and drying cost of $0.02 per point moisture bushel, grower return increases $4.00 /A for each RM unit.
- Optimum RM is variable in WI and depends upon many factors including location, 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 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.

How did we do the work?

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. Corn prices used were $2.00, $2.50, and $3.00 corn. The PEPS corn price is more of a "real world" price annually determined using a marketing strategy where 50% of the crop was sold in November and 25% forward contracted (less basis) to March and July. The November average cash price was derived from Wisconsin Ag Statistics, and the March and July future prices were derived from the Chicago Board of Trade closing price on December 1 every year.

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 and $0.04 per point above 15.5% moisture per bushel for on-farm and commercial corn production systems.

What have we found so far?

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. At a corn price of $2.50 and drying cost of $0.02 per point moisture bushel, grower return increases $4.00 /A for each RM unit.

For example, at Arlington grain yield increases to a maximum around 106-days RM (Figure 1a). At most locations, a significant relationship exists between grain yield and RM. However, at Marshfield and Valders, no relationship between grain yield and RM exists over multiple years of testing (Table 1).

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 an on-farm drying method, grower return is greatest with a corn

hybrid RM of 101-days RM (Figure 1b and Table 2). At Marshfield, a 93-day hybrid optimizes grower return.

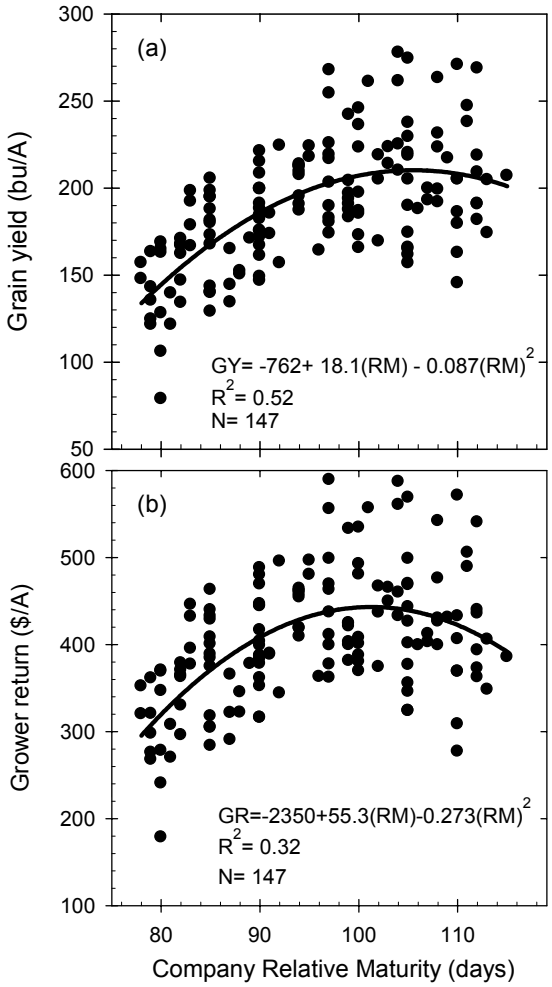

Figure 1. The relationship of relative maturity with a) grain yield and b) grower return ($2.50 corn price, on-farm drying) at Arlington, WI (1995-2004).

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 1. Optimum relative maturity (days RM) for grain yield at various locations in WI.

Location	Years tested	Optimum RM
Arlington	1995-2004	106
Chippewa Falls	1999-2001	104
Fond du Lac	1996-1997	103
Hancock	1995-2004	104
Janesville	1996-1997	107
Lancaster	1996-1997	112
Marshfield	1999-2004	---
Seymour	1999-2001	102
Valders	1999-2001	---

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). Others 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.

Table 2 . Optimum relative maturity (days RM) for three corn production systems.

System:Drying Cost ($ / point bu)	Grain price ($/bu)			
	$2.00	$2.50	$3.00	PEPS
Arlington, WI				
Commercial:$0.04	--	98	99	98
On-Farm:$0.02	100	101	102	101
Livestock:$0.00	106	106	106	107
Chippewa Falls, WI				
Commercial:$0.04	--	--	97	--
On-Farm:$0.02	98	99	100	98
Livestock:$0.00	104	104	104	104
Fond du Lac, WI				
Commercial:$0.04	--	---	99	99
On-Farm:$0.02	100	101	101	101
Livestock:$0.00	103	103	103	103
Hancock, WI				
Commercial:$0.04	--	--	98	--
On-Farm:$0.02	100	100	101	100
Livestock:$0.00	104	104	104	103
Janesville, WI				
Commercial:$0.04	104	105	105	105
On-Farm:$0.02	106	106	106	106
Livestock:$0.00	107	107	107	108
Lancaster, WI				
Commercial:$0.04	106	112	112	112
On-Farm:$0.02	112	112	112	112
Livestock:$0.00	112	112	112	112
Marshfield, WI				
Commercial:$0.04	89	90	91	89
On-Farm:$0.02	92	93	93	92
Livestock:$0.00	--	--	--	--
Seymour, WI				
Commercial:$0.04	--	--	97	--
On-Farm:$0.02	98	99	99	98
Livestock:$0.00	102	102	102	101
Valders, WI				
Commercial:$0.04	--	--	--	--
On-Farm:$0.02	--	--	--	--
Livestock:$0.00	--	--	--	--